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Telephone Engineer

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Telephone and Other Industries The financial reports of utility companies and other industries for 1931, which have been given to the public recently, tell a story which should give telephone people a glow of pride.

For it is evident that of all industries and utilities, the telephone business in general has fared far better than most others.

Some companies, of course, have reported a smaller net income than that earned in 1930. In instances even more rare, there have been reports showing an actual loss. However, for the most part, telephone companies have met their dividend requirements without any trouble. And it has been particularly gratifying to note the large increases in annual income made by some companies.

The New York Telephone company, for instance, has reported net income for 1931 of $35,323,950, which is an increase of $4,844,922 over income for 1930. The Wisconsin Telephone company for 1931 showed a net income of $2,853,589.47, which was an increase of $257,939 over 1930. On the other hand the Southwestern Bell Telephone company's statement revealed a slump of $2,475,995 in its annual

income. However, since its total income for 1931 amounted to $18,967,879, and since it was the first decrease shown in the history of this company's business, its 1931 report can still be considered remarkable.

Examples of this character could be cited endlessly in both Independent and Bell statements. The trend in the smaller companies is much the same as the larger ones, depending largely on the community in which they are located. In industrial communities the telephone business has fared the worst. In some purely farming sectors telephone companies have found it necessary to put up a fight to hold their own, and in some cases for their very existence. But everywhere the telephone business has held up better than other businesses and utilities. Electricity and gas has in most instances retained its 1930 levels, but few of these utility concerns have shown the gains shown by some telephone companies. Aviation has gone into a much larger slump, as has also radio.

When we glance into other industries, such as the automotive, steel, motion picture, iron ore, railway, machinery, and numerous others, telephone people should feel thankful again, for in these industries where profits once were so enormous, they have fallen off tremendously.

This fortunate financial condition of the telephone industry is not entirely due to the fact of the telephone being a utility, but also to the fact that telephone workers have kept constantly before the public the importance and necessity of this utility to them. In many telephone reports, although the company showed a large number of new stations gained during the year, it also showed a relatively small net station loss. This indicates strongly how much greater this loss might have been had it not been for the activity of telephone people.

Lower Fire Rates For the first time in the history of the comparatively young but great telephone industry, it has paused in its swift progress toward increasingly greater heights. In fact, it is well known that in many quarters over the country, telephone men are finding it necessary to put up a stiff fight to maintain the high levels previously reached. This should not cause undue concern. Everything in the world worth achieving has been won only by struggle and strife of one sort or another.

Telephone men, naturally, finding themselves plunged into unexpected difficulties, have racked their brains for new plans and ideas which would aid them in leading their industry onward and upward.

In the midst of this struggle some very constructive ideas have been born, not the least of which was the realization of the crying need for advertising their product and service, and keeping it constantly in the public mind.

Now, in the face of new difficulties which particularly are facing rural telephone companies, because the farmer, who finds himself short of ready cash feels that he can manage without a telephone, a new idea has been born. This idea is based on the thesis that fire insurance interests might cooperate with telephone interests to the mutual benefit of both.

It has been suggested that since all fire insurance premiums are based on the fire hazard of the property involved, and because the presence of a telephone in a building by which aid can be summoned immediately undoubtedly reduces the hazard, that fire insurance companies would consent to a reduction of premiums for homes and other buildings where telephones are located. It was expected that this would help in holding and increasing telephone subscribers.

Although the immediate motive back of this suggestion undoubtedly was intended as benefit for telephone companies, it was sincerely felt, after the idea had been thoroughly examined from all sides, that such a plan would be of equal benefit to the fire insurance companies.

Underwriters' bureaus in Chicago and New York to whom the matter has been broached have not taken kindly to it. They have claimed that fire insurance for farms is unprofitable in any event, because even though alarms are sent in, help arrives too late to be of much assistance, and that in regard to city property, if alarms cannot be given over a telephone, other facilities are provided.

In some instances fire insurance companies have conceded the importance of the telephone to farm insurance, but have contended that premiums could not be lowered for farmer subscribers without making such lowered premiums also apply to urban subscribers to the telephone.

However, since this entire idea is completely new, telephone men must give fire insurance people time to thoroughly consider and examine it. They cannot be expected to accept it overnight.

One stumbling block, of course, is the fact that fire insurance companies for years have had the assistance of telephone companies without paying for it, and naturally they are loath to do so now.

The telephone in the home or office is the quickest, simplest, most natural, and most frequently used method of turning in a fire alarm, regardless of whether fire insurance companies admit it. Telephone directories everywhere contain instructions to be followed by subscribers in case of fire, placed in a prominent place; and telephone operators, in multitudinous instances, have been called on for additional services in such emergencies.

All this, fire insurance people have had for years, and it is very possible that they have accepted the

Improve Outgoing End of Trunking System

Present-Day Methods Which Use "B" Operators' Control Circuits for Outgoing Trunk Indicator Lamps Here Described by John H. Levis, Jr., Telephone Engineer, Rochester, N. Y., in the Eighteenth Installment of His Articles on the Straightforward Trunking System

When the first straightforward trunking systems were installed, many problems confronted engineers, especially at the outgoing end of the trunking system. In fact the outgoing end at the outset of the straightforward trunking system development did not have the facilities for speed as did the incoming end of the system.

Preferential Jack Marking

The first method used at the outgoing end was the preferential jack marking. This marking was used to determine the starting point for the "A" operator, when an idle outgoing trunk was to be chosen to any distant office in the trunking system.

This method required the testing of each trunk circuit until the first idle trunk was found. And if none was found after all of the trunks assigned within the bounds of the preferential marking were tested, the operator had to start testing each trunk circuit in reverse order until an idle trunk was found. If none was available in that particular group, she then would attempt to find an idle trunk by using a trunk group assigned to other "A" operators. The same procedure of testing each trunk circuit was necessary.

This trunking method was very slow and consumed so much of the "A" operator's time that not only was the completion of a trunk connection delayed, but the office originating calls were also delayed. After an idle trunk was found, the "A" operator at times would encounter a delay at the "B" end because the "B" operator would be busy handling trunk calls that previously entered her position ahead of the trunk call.

Preferential Marking

The second method used at the outgoing end of the trunk was the preferential marking. It was the same as the first method with the exception of a trunk group busy tone that was placed on the preferential jack or starting trunk circuit of any group. When this circuit was tested and the tone was heard by the "A" operator, she would at once know that all trunks in that particular group were busy. She then would proceed in the same manner of preferential jack testing in another trunk group to find an idle trunk circuit. In case the "A" operator did not get an all trunk group busy tone when testing the preferential jack, she had to test each trunk as outlined for the first method. When a plug was in the preferential jack of the group which the "A" operator was about to test, she took the test on the exposed part of the plug sleeve circuit.

The second method used in the trunking system increased the speed of handling the outgoing trunk calls, especially in the busy hours when many trunk groups were busy.

Visual Signal Method

The third method used at the outgoing end of the trunk was a visual signal associated with the preferential jack of each trunk group. The visual signal operated in the same manner as the group busy tone system. The difference being that the visual signal gave a distinct visual indication that all of the trunks were busy in that trunk group and no further waste of time was necessary on the part of the "A" operator to make a test on the preferential jack. She then would proceed to another trunk group. In case the visual indication was not operated in the trunk group, the "A" operator had to test each trunk as outlined for the first method. The third method used in the trunking system increased the speed slightly over the second method because no time was consumed in testing the preferential jack.

Busy Signal Method Proves Superior

The fourth method used was a busy signal associated with each outgoing trunk circuit. This method required no testing of trunk circuits. Every outgoing jack to any distant office was available or idle if it did not have a busy lamp indication and it was only necessary for the "A" operator to plug into the jack circuit. When the plug was placed into the jack circuit, the busy lamp indication appeared at all the multiple jacks of that particular trunk circuit. It is obvious that this method was far superior to that of the other three methods. It instantly indicated to the "A" operator the idle trunk to any given distant office, thereby eliminating the testing. The fourth method provided means of making further study of the incoming end of the straightforward trunking system. Up to this point in the development the incoming end of the system was somewhat faster in handling the traffic, but with the individual trunk indication at each outgoing office end the real delay in handling trunk calls began to appear at the incoming end of the system.

At the time the study of the incoming end of the system was being made, a better method of idle outgoing trunk indication was developed, which not only bettered the outgoing end but co-ordinated the outgoing and incoming ends of the system in such a manner that the idle outgoing trunk indication actually indicated an idle trunk circuit and almost al-

---

assistance of telephone companies without perhaps appreciating its importance.

They will continue to receive such assistance, naturally. It was with regret that we heard that some telephone companies, incensed at the cold attitude displayed by fire insurance companies toward their suggestion, were threatening to eliminate all directory information regarding fires and to forbid any employes to cooperate in any way with the placing of a fire call, in order to "bring the fire insurance companies to their senses." Such a move would belittle the telephone company in the eye of every subscriber, and undoubtedly cause cancellation of telephone subscriptions. Assistance with regard to fires has long been one of the primary services of the telephone, and there are many persons who would forego the telephone were it not for the feeling of safety which it brings.

Efforts of telephone men should be directed toward educating fire insurance companies to the fact of the great assistance of the telephone to them, particularly in the case of farm properties, but actually to some extent in the case of all properties. They should be brought to realize the importance of the telephone to them, so that they will be dismayed by telephone cancellations, fully as much as telephone companies, and will gladly lend their assistance in any efforts of telephone companies towards saving and increasing telephone subscriptions.

ways indicated an idle "B" operator at the incoming end.

However, there was an objection to the fourth method. In the busy hours when a large number of outgoing trunks were in use, a much greater number of busy lamps or visuals were in operation, causing a very large current drain on the battery plant of the office.

Present Day Method

The fifth or present day method uses a lamp signal indicator with each outgoing trunk circuit. This lamp indicates that the trunk circuit is idle, in other words, only one indicator lamp in each outgoing trunk group of ten lights, and each lamp will be the idle trunk indication for its particular trunk.

The trunk indicator lamps work on a progressive basis, viz., when an idle trunk is plugged into, the indicator lamp of the next idle trunk will light. When all of the ten outgoing trunks of a group grouped in tens. One is grouped at the outgoing office end, and should there be four separate outgoing offices in the system, each of the remaining three groups of ten trunks would go to these separate offices and the incoming trunks of the other "B" positions of the trunk board would be connected to the distant offices in the same manner.

In A-B intra-office trunking, the inter-office trunking method is used.

At the outgoing office end each group of ten trunks have two common relays, numbered one and two.

Indicator Control Circuits

Each "B" operator has a common set of indicator control circuits which are used to operate the group relays, number one and number three.

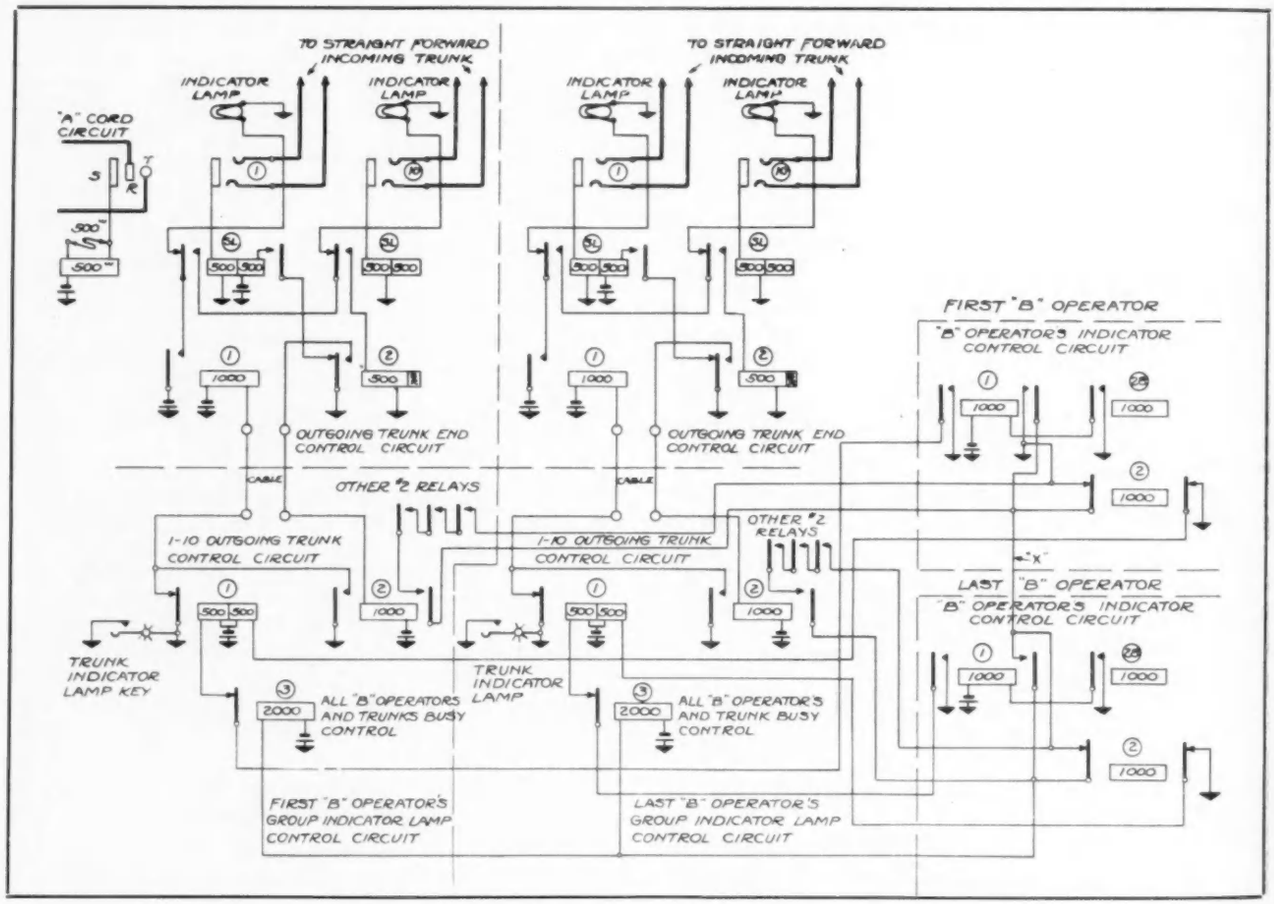
The "B" indicator control circuit is arranged so that when a "B" position is vacated by the "B" operator all of the one relays at the outgoing end will not be operated.

The number one relay places the battery on the S L relay contacts to light the indicator lamp. When such a condition as cited exists, the outgoing trunks will not be taken by "A" operators. The same condition applies to all "B" positions and the outgoing office trunk groups.

The accompanying circuit diagram is arranged to show two "B" positions, known as the first "B" operator and last "B" operator of a trunk board. The point marked "X" is the intermediate "B" position.

Operation of Circuit Controls

To show how the idle trunk and idle "B" operator circuit controls operate, let's assume all "B" positions are occupied and all of the number two relays of the "B" operators' circuits are operated. This condition will allow all the number one relays of the outgoing trunk control cir-


TO STRAIGHT FORWARD INCOMING TRUNK
INDICATOR LAMP
"A" CORD CIRCUIT
OUTGOING TRUNK END CONTROL CIRCUIT
CABLE
OTHER #2 RELAYS
1-10 OUTGOING TRUNK CONTROL CIRCUIT
TRUNK INDICATOR LAMP KEY
TRUNK INDICATOR LAMP
ALL "B" OPERATORS AND TRUNKS BUSY CONTROL
FIRST "B" OPERATOR'S GROUP INDICATOR LAMP CONTROL CIRCUIT
LAST "B" OPERATOR'S GROUP INDICATOR LAMP CONTROL CIRCUIT
FIRST "B" OPERATOR
"B" OPERATOR'S INDICATOR CONTROL CIRCUIT
LAST "B" OPERATOR
"X"

Circuit diagram of outgoing trunk indicator lamp control

are in use, no indicator lamp will be lighted.

The outgoing trunk with idle trunk indication was described in TELEPHONE ENGINEER in the installment entitled "'A' Office Circuits."

Every "B" position is equipped with four sets of number one and two relays, known as the "B" operator's group indicator lamp control circuit. Each "B" position has forty incoming trunks, number one relays in the group control circuit are operated by the ground circuit from the number two relay in the "B" operator's common circuit. The release of the number two relay in this circuit is controlled by the removal of the "B" operator's telephone plug.

With all of the number one relays operated in the above manner there will be no indicator lamps lighted at the outgoing end of the trunks as the number cuits to release, causing the number one relays at the outgoing end to operate. This will light the first outgoing trunk indicator lamp at all four distant offices. The same holds true for all "B" positions and outgoing trunks. This indicates to the "A" operators at the distant offices that an idle trunk to a "B" office exists.

When one of the idle outgoing trunks is taken by an "A" operator the S L relay operates and cuts the indicator lamp of

that circuit off and places the battery circuit from the number one relay to the next outgoing trunk indicator lamp, through the S L relay.

The taking of the idle trunk causes the incoming end of the straightforward trunk to operate, automatically placing the "B" operator on the trunk. This causes the number twenty-eight relay of that position to operate, which, in turn, causes the number one relay of the "B" operator's indicator control relay to operate. This operates all of the number one relays of the outgoing trunk control circuits of this "B" position, causing all the number one relays at the distant offices to release, the result being that no indicator lamps are lighted. This indicates to the "A" operators that they must place new trunk calls through trunk jacks with lighted indicator lamps.

When the "B" operator has pre-selected or completed the call, she will be idle and the number twenty-eight and all number one relays of the outgoing trunk control circuits will release and the indicator lamps will light, showing that idle trunks are again available to that particular "B" position.

Other Uses of Indicated Lamps

There is another condition that exists in connection with the idle "B" operator part of the system. Frequently all of the "B" operators are busy with trunk calls at the same time and from the description of what happens when one "B" operator becomes busy, it is obvious that with all "B" operators busy there would be no lamps indicating at the outgoing end. This would indicate to the "A" operators that they would not be able to place any trunk calls. Of course this condition does not exist for any great length of time as the incoming end of the straightforward trunk operates quickly, because the system has been especially developed for speedy operation.

To release the condition when all "B" operators are busy, the number three relay in each designated "B" position, the all "B" operators' circuit and the trunks busy control operate in each "B" position as they are all connected together. With all the number twenty-eight and number one relays operated in the "B" operators' indicator control circuits, there is a series ground circuit which starts at the first "B" operators' control circuit and passes through all intermediate "B" control circuits at point marked "X" to the last "B" operator's number one relay to the number three relays. With the number three relays operated the busy control circuit from each "B" position to the number one relay of the outgoing trunk control circuit opens, causing the indicator lamp of an idle trunk to light.

This part of the indicator control circuits enables the "A" operators to take trunks in any group up to the time when all trunks in any one group are busy. When the all "B" operators' busy circuit releases, the idle "B" operator part of the control circuit functions.

The possible idle "B" operator part of the lamp indicating outgoing trunk system means that at one time an "A" operator takes an indicated idle outgoing trunk that reaches the "B" operator at once. This is an idle trunk, idle operator performance. Shortly after the above performance the same "A" operator places a trunk call in an indicated idle trunk. The condition at the "B" operators' end is not the same. The all "B" operators' busy control circuits are operated and the "A" operator does not reach the "B" operator on that particular trunk until the sequence cut-in circuit of the straightforward trunk circuit has progressed in the proper direction to reach the trunk call. The cause of the delay is, that when all of the "B" operators were busy a large number of trunk calls were placed in indicated idle trunks, thereby loading the incoming end of the trunking system.

Need Additional Circuit

In operating the indicating lamp system another circuit must be provided to care for the possible all outgoing trunks busy in all four groups of the ten each or the complete forty trunks to any one "B" operator's position.

This circuit is necessary in order that the all "B" operator's busy control circuits can function. As was previously stated, these circuits function only when all the "B" operators were busy and the number twenty-eight and number one relay of each "B" position were operated. But in the above situation the "B" operator is not busy, but all of the trunks are busy and the twenty-eight and number one relays of that particular "B" position are not operated and in order to maintain the all "B" busy circuits the circuit of the all "B" busy control at the number one relay in the "B" position must be closed. This is performed by having a common relay number two for every ten outgoing trunks located at the outgoing end. These relays operate when all the S L relays are operated. With these relays operated a circuit is closed over a cable conductor to the proper "B" position number two outgoing control relay. When this relay operates, it places a ground back to the outgoing trunk number one relay over a cable conductor which maintains a circuit for the holding of the outgoing trunk number two relay through the contacts of all the operated S L relays. The same is true of all other three groups.

With all the number two relays in the "B" position control circuits operated, the circuit is closed at the number one reloy of the "B" operator's indicator control relay, thereby maintaining the all trunks' busy control circuit in the correct conditions.

When any one or more of the busy outgoing trunks have been cleared, the indicator circuits of the "B" operator perform in the usual manner.

The accompanying circuit diagram is in simplified form so that the general scheme of the system can be more readily understood. The complete system of indicator control circuits are connected to terminals located on the intermediate distributing frame. This enables the proper cross connections to be made more easily.

The "B" position control circuit relays are located in the same relay bay with the incoming trunk relay equipment.

EIDE ELECTED MEMBER OF TELEPHONE PIONEERS

Randolph Eide, president of the Ohio Bell Telephone company, in March became a member of the N. C. Kingsbury Chapter, Number Two, of the Telephone Pioneers of America.

Upon the completion of 21 years of telephone service, Mr. Eide met the fundamental requirement of the Pioneer group that its members shall have served 21 or more years in the telephone business. His telephone career dates back to

Randolph Eide, President, The Ohio Bell Telephone Co.

March, 1911, when he entered the New York Telephone company as traffic student after his graduation from the University of Illinois. Following this preliminary training, he was advanced to positions which ultimately led to his election to the presidency of the Ohio Bell company two years ago.

He served as traffic supervisor for the Bell companies operating in Missouri, Arkansas and Michigan before coming to Ohio in 1917 as traffic superintendent for the former Central Union Telephone company at Columbus.

Elementary Course in Telephone Practice

In This Ninth Installment of the Telephone Course O. B. Fensholt Tells How to Produce Electricity by Magnetism and How to Increase or Decrease Current; Explains Reasons for Transposition; and Analyzes Peculiar Chemical Action Known as Electroplating

Producing Electricity by Magnetism

We have just seen how we can produce magnetism by electricity.

One nice thing about our work with electricity and magnetism is that if we know something about one we can reverse the condition for the other.

We know that we can produce magnetism by electricity; therefore we should

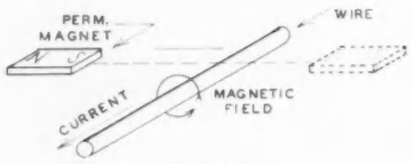


Fig. 43

be able to produce electricity by magnetism.

We saw that if we put an electric current through a wire, that we set up a magnetic field. So if we put a magnetic field near a wire we should produce an electric current. Remember there is a difference between a magnetic flux and a magnetic field. The flux is just the force as we explained in lesson 29, while a magnetic field is the magnetism set in motion.

Then if we put a permanent magnet alongside of a wire, the flux will have no effect on it, but if we pass this magnet back and forth over this wire, we are setting up a magnetic field which will

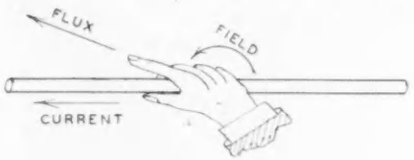


Fig. 44

travel into the wire, and the field sets up an electric current in the wire.

Figure 43 will show you how this field is set up.

Here again we can apply the right hand rule, except, that we place our fingers in the direction of the magnetic field around the wire; and the index finger pointing to the direction of the flux, then the thumb will show the direction of the current in the wire. Figure 44 will show this a little more clearly.

Therefore let the index finger point the direction of your magnet of figure 43, and this direction we call flux.

If we move the magnet back in the reverse direction, we have reversed our flux, which in turn reversed our magnetic field, and that caused the current to flow in the opposite direction.

Now if we wish to increase our current, we must cut more lines of force, or set up a greater field. This can be done by either having more magnetism or more wires, or more of both. The wires we add must of course be added

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* * *

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Yours sincerely,
DAVID H. CARLSON.

in series, so we will use a coil of wire, and by moving either the coil over the magnet, or sending the magnet through the coil continuously in one direction we are setting up a current in one direction or a direct current.

This is illustrated by figure 45.

Transpositions—Electrical and Magnetic Actions

The reasons for transposition can now be understood, when we understand that an electrical current sets up a magnetic field also that a magnetic field sets up an electrical current.

Let figure 46 represent two telephone lines. Line 1 consists of wires A and B, and line 2 consists of wires C and D.

When line 1 is in use, let us assume that the surge of current is going in one direction in one wire, and returning therefore in the opposite direction in the other wire.

The bottom of figure 46, illustrates the cross section view of the wires. This shows the magnetic field set up around wires A and B, with this current flowing through line 1.

This magnetic field from wire B,

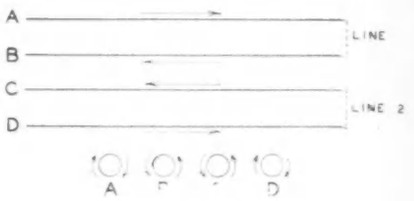


Fig. 46

travels out through the air until it strikes wire C of line 2, which causes a magnetic field to build up around wire C. This magnetic field in turn produces a current of electricity, and by applying our "Right hand" rule you will notice that this current will be in the direction as shown by the arrow, on line C of figure 46.

Then if line 2 is also in use, this surge of current would then return in line wire D, and the "foreign" or induced current is heard in line two, and this is what causes "crosstalk."

To do away with this "crosstalk," we will have to transpose our lines. By that we mean that we will have to do something to neutralize this induced current that goes from one line to another.

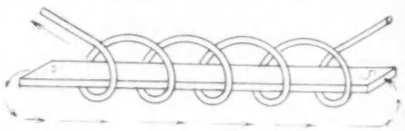


Fig. 45

Let us now make a "transposition," or transpose our wires, and see what occurs.

Let figure 47 represent the same lines 1 and 2, except that we have transposed line 1 at point X. by transposing we mean that one wire has crossed over the other wire to the other side (not a cross-connection).

You will notice that the wires on the M side of figure 47 are the same as the diagram of figure 45. Therefore the current action in M side or before the transposition X will be the same as it was in figure 46.

In part N of figure 47 we have brought

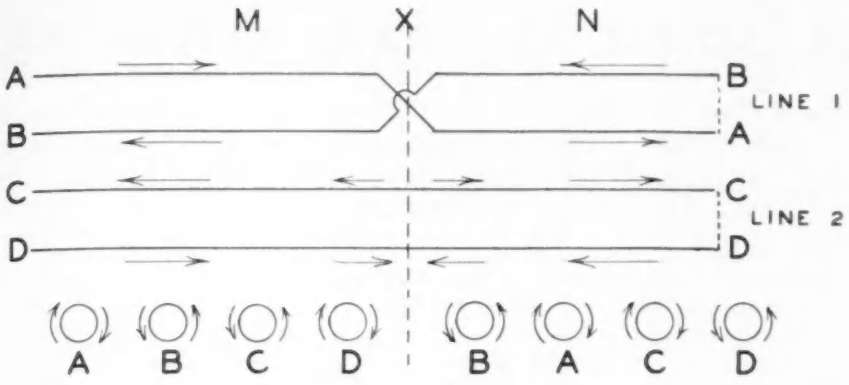


Fig. 47

wire A alongside of wire C, which reverses the magnetic field in wire C at point X as shown in the bottom of figure 47. This magnetic field in the reverse direction in line C wants to reverse the direction of current in line C. Then if the current wants to go in one direction in one part of the wire, and in the reverse direction in the other wire, the result will be that there will be no induced current in that wire. This is also true of wire D. The only current that will go through these wires is the regular talking current, as applied to that line.

Transposition is also used to stop oscillations. That is, if line 2 was not being used, the magnetic field from line 1 would set up a magnetic field in line 2, and this would be increasing until it would be so large as to affect back on line 1. Therefore transposition also acts as a break to this magnetic field. Transposition is also used to stop oscillations, where telephone lines parallel high tension (AC) lines.

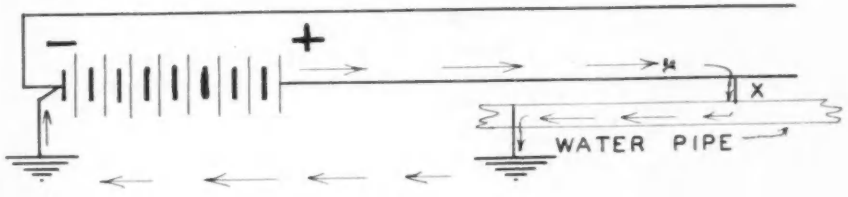


Fig. 49

This is one reason why telephone companies use twisted pair wires, and where a parallel wire is used the company states that a twist must be made every so many feet.

Electroplating (Electrolysis)

We must be able to understand that an electric current must be continuous, and when we talk about the positive and negative of a battery we mean the feed and return.

If we take a jar, as shown in figure 48, and put a solution of copper sulphate and water in the jar, and then hang a copper-plate on the positive wire, and a spoon on the negative wire of a battery circuit, the current going through this circuit will cause small particles of copper to be carried from the copper plate to the spoon.

This is known as electroplating.

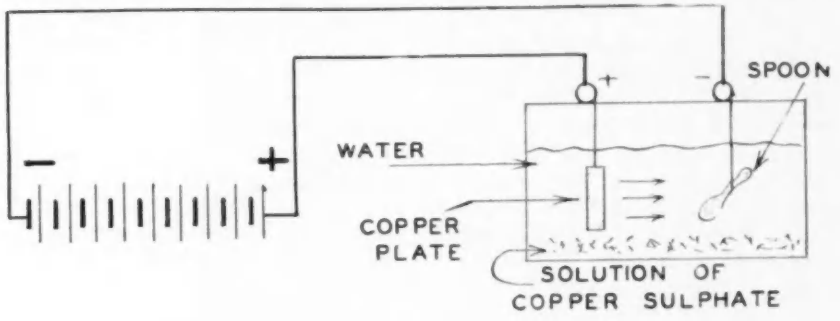


Fig. 48

In this case the spoon would be copper-plated. If gold, silver, or nickel-plating was to be done, the positive electrode would have to be of that material and the chemical would also have to be changed.

In telephone work we are bothered with a condition of electroplating, only we call it electrolysis.

Our batteries at central office exchanges have the positive of the battery connected to ground, for electrolysis reasons.

Let figure 49 represent a central office battery with the ground on the negative instead of the positive. Let "X" represent a "ground" from line to water pipe. The current would then go from the positive of the battery, through the line, through "X" through the water pipe, then through the earth back to central office battery ground.

The earth sets up a chemical action the same as in electroplating, and the water pipe would be the positive electrode and the central office battery would be the negative electrode, therefore, there would be small particles of water pipe deposited on the battery "ground." After a short time a hole would be "eaten" through the water pipe by this process.

Figure 50 shows the proper ground on the central office battery, on the positive connection. Again lot "X" represents a "ground" on the line.

The current would now go from the central office battery, through "ground," to the water pipe, then through "X," through the line, and back to the battery. Again there would be electroplating, but this time it would be from central office "ground" to the water pipe, and would be eating away the central office "ground," and no damage would be done to the water pipe.

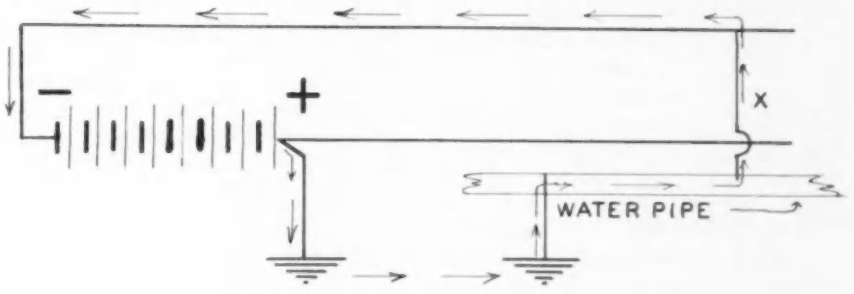


Fig. 50

TAKES BROTHER'S PLACE AS PHONE COMPANY HEAD.

John M. Parrett, has been selected by the directors of the Princeton Telo. Company, Princeton, Ind., to succeed his brother, the late Fred R. Parrett, as manager of the telephone company.

Praise Pioneer Spirit at Texas Meeting

President Gardner Advocated Hard Work as Panacea for Ills of Industry; A. R. MacKinnon Urged Change in Mental Attitude as Solution to Today's Problems; Dr. W. B. Boyd Praised Telephone Heroes; at 27th Annual Convention of Texas Independent Association at Ft. Worth

The sturdy pioneer spirit of the Independent telephone men who built up a great Independent telephone industry in the Lone Star State, overcoming many handicaps to provide telephone service to inland towns and rural communities in the early days, still survives among the real Independent telephone people of Texas and will carry the industry through the present crisis and prepare for a better day.

Thus President L. S. Gardner addressed the 27th annual convention of the Texas Independent Telephone association held in Fort Worth, March 22 to 24.

He urged telephone men and women to study the conditions in their industry, to keep a level head, and to work consistently. Hard work, he said, offers the best solution to the telephone problem.

He reminded his hearers that the last two years had indicated that the telephone industry has something of real value to sell to the public, and said that from now on telephone employes must sell telephone service and realize that it is just as much their job to do that as to perform their routine duties.

Texas Telephone Laws

President Gardner made a brief report of the legislative work of the association at Austin, as the regular session of the legislature last year did not close until nearly three months after the 1931 convention.

Only two bills were passed which affect the telephone industry, and both were favorable. One makes it a misdemeanor, punishable by a fine of from $1 to $100, for anyone to use a telephone in the office, place of business, or home of another person, firm or corporation, for a long distance conversation, and have the tools charged to that telephone without the consent of the subscriber in whose name the telephone is registered.

The other law enacted was for the prevention of the fradulent operation of coin-box telephones, or coin collectors attached to telephones, by the use of slugs, counterfeit, or foreign coins. The law makes such act a misdemeanor and punishable by a fine not exceeding $200 or 90 days' imprisonment, or both.

Re-Elect Gardner President

President Gardner, who comes from Waco, Texas, was re-elected to head the Texas Independent association for another year. John Y. Rust of San Angelo, T. P. Bearden of Baird, and A. L. Robb of Electra were chosen as vice-presidents, and Oscar Burton of Tyler was chosen secretary-treasurer.

Directors for the coming year are: T. B. Beardon, Baird; Oscar Burton, Tyler; R. B. Fairly, Lubbock; L. S. Gardner, Waco; C. E. Hoy, San Antonio; George M. Johnson, Santa Anna; J. C. Paxton, McAllen; A. L. Robb, Electra; E. P. Seaman, Georgetown; D. F. Shilling, Wingate; Jean Shotwell, Lufkin; Sam H. Shutt, Sherman; D. T. Strickland, Dallas; James E. Stuart, Texarkana; R. B. Still, Kansas City, Mo., and Merton Swift, San Marcos.

John H. Bailey, general counsel for the association, addressed the second general session on the subject of the Texas truck law as it applied to telephone companies.

"Few persons, including the legislators, are able to understand the law," Mr. Bailey said. "House bill 336 has been the source of constant confusion.

"Through a recent interpretation, we have secured 30-day permits, which make its regulations less stringent. The permits allow the transportation of poles of any length. Regulations on loads are not troublesome."

Need Change in Mental Attitude

A changed mental attitude was offered the members of the association as the solution of present-day business problems, by A. R. MacKinnon, Kansas City, Mo., supervisor of service sales, Telephone Bond and Share company.

He expressed the belief that the slump in business will be over when mental attitudes change. "Our adjustment to changed conditions is a reality," he said, "but the remainder is mental fear. The telephone industry has weathered the adjustment successfully, due to the sound foundation upon which it was established.

"Telephone rates never were high enough to warrant over-expansion. As a result, our industry did not collapse when general business conditions were depressed. We are selling a daily necessity and not a luxury."

He advocated the sale of telephone service as a business necessity to the farmer, who in recent years has become as much a business man as the city man.

"The Sale of Telephone Service" was the subject of an instructive address by W. M. Hemphill of Dallas. He went into detail as to the methods used by many companies in speeding the sale of service by employes.

Address Makes Impression

A decided impression was made upon the assembly of telephone people by Dr. W. B. Boyd's address on "You and Your Work." Dr. Boyd is from Chicago, and a representative of the Telephone Securities company.

He praised the lineman who climbs a pole in mid-winter to repair the wires that join the world in communication, and the "central girl" whose voice is always cheery as she asks, "Number, please?" as heroes of the industry.

Miss Anne Barnes, Des Moines, Iowa, special traffic representative, United States Independent Telephone association, gave a talk on "The Fruit of the Tree," using charts to emphasize important points. She spoke of the results that would come from proper training and education of operators in the industry.

"Proper Central Office Management" was the subject of a talk by R. E. Glaze, Fort Worth, Texas, traffic supervisor, Southwestern Bell Telephone company. He spoke principally on technical problems and the application of efficient management in the operating room.

Traffic Conference

At a session of the traffic conference a demonstration was presented by several operators from the Southwestern Bell Telephone company in Fort Worth, under the title "How Sales Are Made by Traffic Employes." The demonstration was along the lines of selling telephone service.

TELEPHONE EXPANSION TO COST $21,000

Plans for expansion of the Fort Atkinson Telephone system, Fort Atkinson, Wis., estimated to cost about $21,000, have been announced by H. G. Miller, manager.

The enlargement of telephone facilities in Fort Atkinson is to include an expenditure of $8,000 for subscribers' telephones and associated equipment, and $7,000 for additional equipment in the central office. Additions to the outside plant will requite an expenditure of $6,000.

The Fort Atkinson exchange now provides service to 2,235 subscribers' telephones, an increase of twenty-five being secured last year.

Outline to Follow in Planning for Future

In This Third Article of the Series on "A Development Study of the Toll Center District," F. J. Dommerque, Fellow A. I. E. E., Gives the Primary Requisites for Starting the Development Study—Namely, the Number of Subscribers to Be Expected in 20 Years and Their Calling Rate

Determination of Future Number of Subscribers

The number of subscribers a community will have after twenty years can, of course, not be determined with accuracy; all that is possible to do consists in making a fair estimate on the basis of present and past conditions. As telephone plants have been operated for years the following method of ascertaining the future number of subscribers seems recommendable. Take the number of subscribers the exchange started in business with, then note the time elapsed in which this number has doubled; then the time elapsed in which it has doubled again, and so on until the present date; that is, the date when the development study is made. From these data the *rate* of increase can easily be determined by plotting a curve with the years as abscissae and the number of subscribers as ordinates. Extending this curve at the same rate for 20 years would give the number of subscribers to be figured on.

We are speaking here of number of subscribers. In the case of the development study this is equivalent to number of lines connected to the exchange, as will appear later.

Plotting a curve from the U. S. census reports of the past will give the rate of increase of *population* in the community, and extending the curve sufficiently to cover the period over which the development study is to reach, will give a fair conception of the rate of increase to be expected for the future.

A *residence* subscriber is represented by a family. The average size of a family is also obtainable from records. Having the probable number of future inhabitants, a division by the average number of members in a family will give the number of families to be expected in the future, as the average number of persons in a family will not increase. Thereby the number of *possible* residence subscribers is obtained. We say possible; there is today electric light in practically every house in a community; who knows, in twenty years there may be a telephone in every house; in any case there will be proportionally more houses with telephones in the future than at present and a "house-to-house count" will give a basis for forming an opinion on that subject. In this count a distinction must also be made between classes of families. In sections of the community where the richer class lives in more pretentious houses, there may be demand for more than one telephone per family.

To estimate the future requirement on *business* telephones one can easily estimate by his familiarity with present business conditions in the community what the future has in store. There are always certain arteries in which the expansion of business will run. Every community has its Main Street.

We will add some indications formed from a survey of present business conditions. In large establishments, such as factories, modern hotels, banks and wholesale houses, private branch exchanges will give the best service. In the number of subscribers we figure on for the future, private branch exchanges are not represented by their individual subscribers, but by the number of trunk lines connecting the P. B. X. with the telephone office, not forgetting any extra trunks which may be required for battery charging. For large stores—that is, for the most prominent stores in a community located in the toll center district—at least two telephones must be counted on, and on one telephone for a small store. It will also be necessary to include the pay stations in the number of future subscribers. They are not included in the telephones mentioned above for stores and hotels, they form a class by themselves and require individual lines.

BINDS VOLUMES

Oakland, Calif.

Telephone Engineer Publ. Co.,
Chicago, Ill.

Gentlemen:

My December issue of TELEPHONE ENGINEER failed to arrive. The January issue came on time, so I am sure that my subscription was received.

Will you kindly supply this deficiency, as I bind the volumes as they are completed and keep them at the office for ready reference. Please accept my thanks and appreciation of the excellent magazine you publish.

Yours truly,

ARTHUR B. FRY,
Telephone and Telegraph Engineer, Railroad Commission of the State of California.

House-to-House Count

As the size and extension of the underground conduit system of a community depends upon the cables required by the future number of lines to be accommodated, and as the conduit cannot be enlarged in the future without great expense, it is absolutely necessary to form as complete a picture of the conditions as they will be in twenty years as it is humanly possible. By making a count from house to house one familiarizes himself with the standing of the inhabitants by estimating their income. It has been customary for development studies to assume that a household can expend 2 per cent of its income on telephone service. This would give an indication as to whether a telephone at all is to be reckoned on, and if it is, whether a single or party line telephone. To estimate the income it may be assumed that a family can spend about one-fifth of the income for rent and thus one can calculate back.

In the field work connected with the development study one must be able to judge whether any house (residence or business) will after 20 years still serve the same purpose as at present, or whether it will be replaced by a new and larger building. In vacant plots the surroundings will indicate what improvements are to be expected in the future and what the demand on telephone service will be. All in all one must study the character of every street to form an idea what it will look like in 20 years from now.

When making the house-to-house count the number of members in the family living in each house at present should be ascertained, also their occupation and other particulars of value for the future, because, if the family has no telephone at the present time, it is still a prospect for the future when the children grow up. At the same time it is opportune to make a record of the condition of the street and the surroundings of the house, as the kind of paving and back yard, etc., is valuable information to have. Furthermore it should be ascertained whether there are alleys in between the building plots which may serve for distribution.

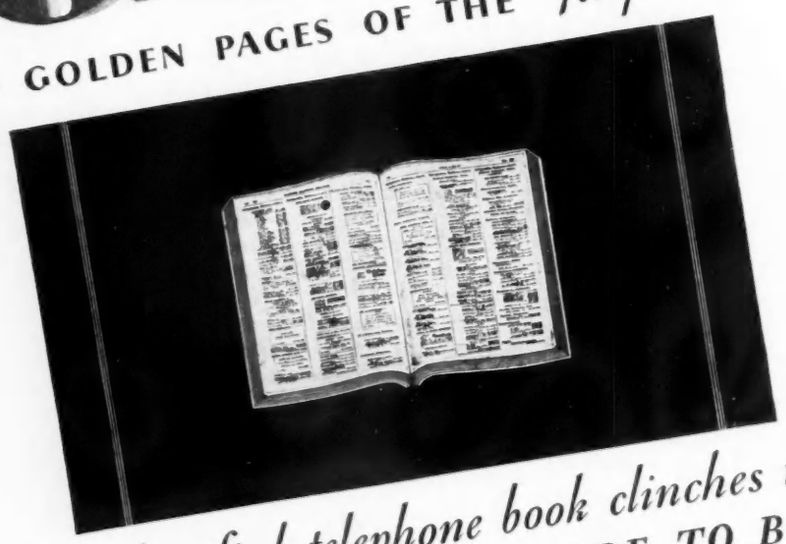
Having finished the house-to-house count and estimated the future number of subscribers, this number must be reduced to lines.

A party line actually is one line regardless how many parties are connected to

Showin

GOLD

IN THE GOLDEN PAGES OF THE *Telephone Book*



The classified telephone book clinches the sale by telling your prospects "WHERE TO BUY IT"

Many a "sale" that national advertising makes gets lost on the road to market. Lost—or kidnaped by competitors!

"See your local dealer" says the advertisement. But that's much too vague a phrase to ring the dealer's cash register. Prospects are apt to let the matter drop right there.

The "Where to Buy It" pages of the telephone book can clinch the sales that your advertising makes. For in those pages the dealers selling your product can be listed under your trade mark. Then if your national advertising and broadcasting direct readers to these local listings, the circuit is complete.

A feature of the plan is that you need take listings only in those communities where you have distribution.

Look in the classified section (the golden-yellow pages, in most telephone books). Look for Goodrich under tires, for Stromberg-Carlson or R. C. A. under radios. Or Mimeograph, Addressograph, Sherwin-Williams, Raybestos, Corona or any of the other "Where to Buy It" users. See just how this plan is followed by some well-known advertisers.

Then apply this principle to your own sales and merchandising problem. Surely, you'll agree that there is "gold in the golden pages" for you, too!

For data on rates, coverage, dealer tie-ups, etc., inquire of your agency or as directed below.

WRITE OR TELEPHONE Trade Mark Service Manager, American Telephone and Telegraph Company, 195 Broadway, New York, N. Y. (EXchange 3-9000)—or 208 W. Washington Street, Chicago, Ill. (OFficial 9300).

The original of this advertisement appears in two co

business how to get

GOLD

ut of golden pages

AN important factor in the distribution of a nationally advertised trade marked product or service is the directing of prospective buyers to authorized local dealers and service stations.

To acquaint sales and advertising executives and manufacturers with the possibilities of the "Where to Buy It" feature of classified telephone directory as a medium for listing their local dealers, a series of advertisements, similar to the one reproduced on the opposite page, is being run in a list of national business and trade papers.

Usually the illustration features the familiar yellow pages of the classified directory, with a close-up view of an actual trade mark heading.

Copy stresses the merchandising advantage of making it easy for the public to find out where to buy nationally advertised goods.

Today, more than ever, this advertising should interest merchandising executives, and its effect should be reflected in the greater use of the classified pages of telephone directories throughout the country.

AN ADVERTISEMENT OF THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY

it; but in determining the lines required, the party line must not be counted as fully loaded as rarely sufficient subscribers requiring party line service are found in close enough proximity to fill a party line. For this reason it is customary to count for a two-party line the equivalent of one and one-half lines and for a four-party line the equivalent of two and one-half lines when making a five-year study; the corresponding figures for a twenty-year study would be 1.6 and 2.7 lines respectively.

The final number of lines to be accommodated at the end of the 20 years is then entered upon the map prepared previously with the present number of subscribers or rather their equivalent lines noted in each block. The future number in each block may be annotated in a differently colored ink.

Traffic Data

The next important item for the development study is the determination of the calling rate for the different classes of subscribers. This rate varies considerably with the size of the community; we have to rely on past experience for the information. It is hard to say whether the calling rate of the past will still be the same after twenty years, but it seems reasonable to assume that it will be. It is also doubtful whether the present method of unlimited service will be continued after twenty years in the communities tributary to the toll centers.

The calling rate for measured service in *larger* cities has been:

Business direct lines, 12 to 15 calls per line per day.

Residence direct line, 4 to 8 calls per line per day.

Residence 2-party line, 3 to 5 calls per line per day.

Residence 4-party line, 2 calls per party per day.

With unlimited service the calling rate was from 3 to 5 times higher.

The records accessible to us for *smaller* plants, such as are found in the toll center districts, are of European origin, but there does not seem any reason why they should not suit our purpose. However, we have slightly increased the European calling rates and as their figures for present traffic collected from experience since 1884 have been increased only a small fraction for the period of the development study, we quote their figures assumed for the future, as follows:

Local calls per subscriber per day in the toll center exchange = 4.

Local calls per subscriber per day in an exchange of the 1st order = 2.

Local calls per subscriber per day in an exchange of the 2nd order = 1, 5.

The Europeans do not take to party line service, consequently these figures are based upon direct lines. As we are in favor of party lines, which is shown by the fact that the number of party line subscribers in the United States at the present time is practically twice the number of direct line subscribers, we feel justified to assume the above calling rate for exchanges of the 1st and 2nd order to hold good for party line subscribers of all classes including the toll center. Therefore we would increase the calling rate for direct line service from 2 to 3 in exchanges of the 1st order and 1, 5 to 2 in exchanges of the 2nd order.

It will be of interest to note also the European figures of outgoing trunk line calls corresponding to the above local calls given in the European records for the future time. They are:

0, 3 out trunk calls per subscriber per day originating in the toll center exchanges.

1, 0 out trunk calls per subscriber per day originating in an exchange of the 1st order.

1, 5 out trunk calls per subscriber per day originating in an exchange of the 2nd order.

These calls are only for subscribers inside the toll center district and do not include any toll or long distance calls for subscribers outside of the district.

We are justified to follow the European example in not increasing the calling rate much for the future, as the new subscribers will be mostly people of lesser means and lesser community of interest with the outside world.

For use in traffic studios the calling rate per day is usually reduced to the number of calls in the busy hour. From observations it has been found that the ratio of calls in the busy hour to calls per day varies from 1/7 to 1/11; 1/7 for the heart of a community where the business is at the highest and concentrated to the fewest hours; 1/11 for the residential districts, where little business is transacted and where the calls are more evenly distributed over the day.

Peg Counts

It is customary in larger manually-operated exchanges to count the calls made by the subscribers periodically, say, once a month, on a regular full business day by means of mechanically or electrically operated counters. The counters are read every hour. From these observations a traffic record is prepared, the so-called peg count. It would be advisable to make such a traffic record once in a while in the small exchanges. There is no need for an elaborate mechanism for that purpose, a pad of paper will answer the purpose. The paper may be ruled and arranged so that the calls can be noted by hours; also the paper sheet should be divided in columns, so that the local calls can be noted in one column and the outgoing trunk calls in additional columns, one for each exchange in the toll center district. Another column should be set aside for the calls outside the toll center district. All this information is extremely valuable, and would give a check on the traffic figures assumed for the future.

Definition

To avoid misunderstandings we will in our study make a distinction in terms between "exchange" and "office." An exchange designates the entire switching equipment used in the community for operating purposes, but does not include the wire plant. The exchange equipment plus the wire plant constitute the telephone plant. An office is a single unit of operating equipment; therefore we speak of a single-office exchange and a multi-office exchange, according to the number of offices in the exchange.

WRAPE CHOSEN PRESIDENT OF ATHLETIC CLUB

Harold J. Wrape, president of the Benwood-Linze company and the Trav-Ler Radio and Television corporation, of St. Louis, Mo., was elected president of the Missouri Athletic association at a meeting of the board of governors held March 23.

Mr. Wrape has been a member of the board of governors of the Missouri Athletic association for the past seven years, and a member of the club since its inception.

MOUNTAIN TOWN SWAMPED WITH CALLS RELATIVE TO KIDNAPED BABY

The Southern Continental Telephone company found itself facing a crisis on Sunday, March 13, when the little mountain town of Crossville, Tenn., was reported to possess the famous Lindbergh baby and therefore that company's Crossville exchange became temporarily the busiest exchange in the country.

Within an hour after the telephone fiasco of incoming calls started, this company cut on to its one position board, five additional circuits, and installed seven private telephones for the use of the public. Two circuits were cut directly through to Nashville and one to Knoxville.

During one hour it was estimated that more than 300 incoming calls were handled and during 24 hours the completed connections ran into thousands. One national news service held a circuit from Atlanta to Crossville for four hours and five minutes, and one of the Nashville dailies held another circuit for six hours. Calls from London and Paris were among the toll calls completed at Crossville that day. Local and outgoing calls were practically abandoned during the deluge.

VACUUM TUBE THEORY AND PRACTICE

SUBJECT: SOUND PROJECTION PRACTICE—PART III

General

This article, which is the third of a series dealing with sound projection practices discusses the microphone amplifier, microphone current supply, and microphone control equipment, and public address and program service work.

As discussed in article II of this series, a public address system consists of several separate units, which when connected together form the complete system. A thorough understanding of each of the individual units is highly desirable on the part of those in charge of public address, installations, inasmuch as the best results can only be obtained when the respective units are all properly coordinated and adjusted. Fig. 1 shows the function of each unit of a public address system.

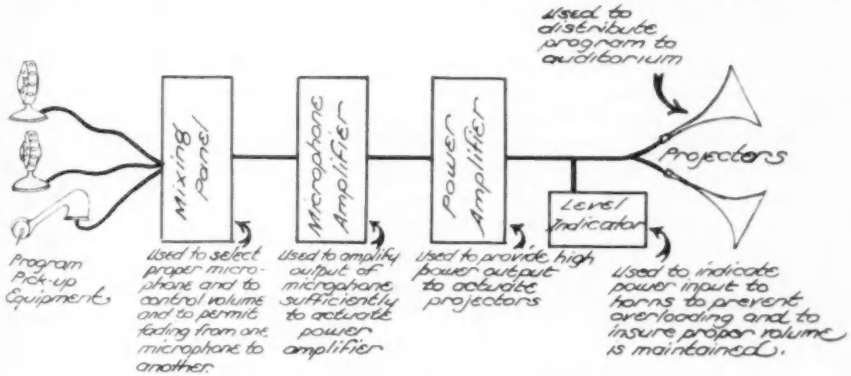

Used to distribute program to auditorium
Mixing Panel
Microphone Amplifier
Power Amplifier
Level Indicator
Projectors
Program Pick-up Equipment
Used to select proper microphone and to control volume and to permit fading from one microphone to another.
Used to amplify output of microphone sufficiently to actuate power amplifier
Used to provide high power output to actuate projectors
Used to indicate power input to horns to prevent overloading and to insure proper volume is maintained.

Fig. 1—Component parts of public address system

When a system "goes dead" on an important job, quick action and thinking is necessary to promptly restore service.

Microphone Amplifiers, Current Supply Arrangements and Mixer Panels

Microphone must be supplied with direct current either from a battery, or from a rectified alternating current source.

Carbon button microphones require 10 to 45 milliamperes per button, and condenser microphones require a polorizing potential of approximately 200 volts.

Microphone current for two button carbon microphones is usually supplied either by a 6 or 12 volt battery, or by means of a type 80 or similar rectifier tube which is used in connection with the plate supply of the microphone amplifier.

The method of supply battery current to the carbon button microphone is shown in fig. 2. It will be noted in this diagram that a transformer with a center tapped primary is required to couple the microphone to its amplifier.

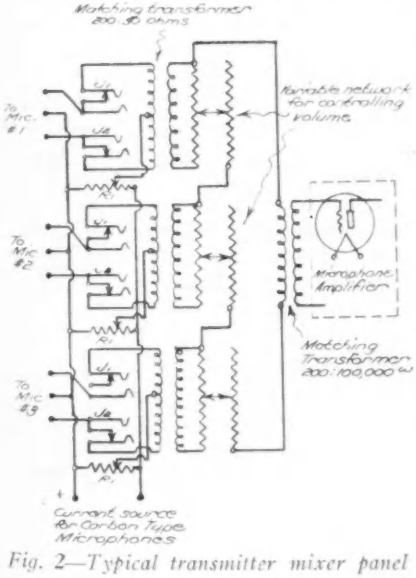


Fig. 2—Typical transmitter mixer panel

The impedance ratio between primary and secondary of the microphone transformer should be 200 to 100,000 in order to properly match the impedance, of the two 100 ohm buttons to the grid circuit of the amplifier.

The potentiometer R permits the current flowing to the two buttons to be adjusted to the desired value and jacks J_1 J_2 provide a means whereby a milliammeter can be inserted in series with the current supply lead to each button so that the current taken by each button can be read.

Condenser Transmitter Amplifier

The condenser transmitter because of its high impedance, as well as its low output level requires that a one stage vacuum tube amplifier be used and that it be located very close to the transmitter. This tube serves the dual purpose of raising the output level, and providing a low impedance output circuit which may be connected to the regular microphone amplifier through a flexible cord without affecting the characteristics of the condenser microphone. It is obvious that any attempt to connect a condenser microphone to the regular microphone amplifier through even a relatively short pair of wires would be very difficult as the mutual capacity of the pair might easily be greater than the capacity of the microphone itself, and would therefore act as a shorting capacity across the microphone.

Figure 3 illustrates a typical condenser-transmitter amplifier circuit.

In this circuit it will be noted that the condenser is in effect resistance-capacity coupled to the grid circuit of the single stage amplifier. A matching transformer is used to match the plate impedance of the tube to the regular microphone amplifier.

Microphone Mixer Circuits

On large public address jobs it is often necessary to have several microphones located at various pick up points and a switching arrangement is required to permit shifting from one microphone to the other without setting up disturbing noises in the projectors. To accomplish this a switching arrangement which is referred to as the "fader or mixer panel," is used.

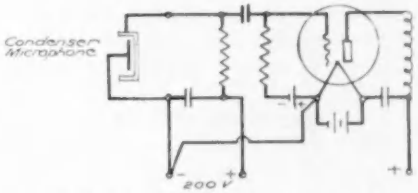


Fig. 3—Condenser microphone and amplifier circuit

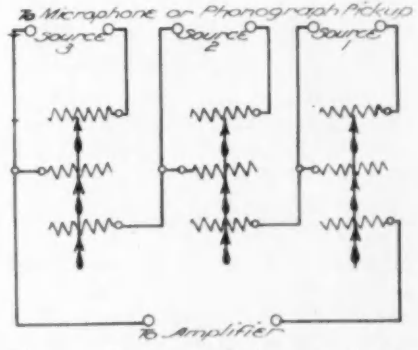


Fig. 4—T type variable network for transmitter control

Figure 2 illustrates a mixer circuit suitable for handling three microphones. It will be noted that a constant impedance type of network is used to control volume

and to permit "fading" from one microphone to another. The transformers are generally designed to have an impedance ratio of 200 to 50 ohms and the variable networks are so designed to match the 50 ohm secondaries and to give a total output impedance series of approximately 200 ohms. The output impedance is constant regardless of the setting of the variable networks, however the load

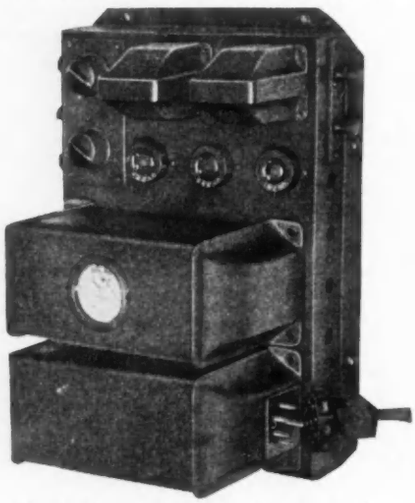


Fig. 5—Samson Electric Company microphone amplifier

across the secondary of the microphone transformer varies with the setting of the networks.

Figure 4 shows the T type mixer control which is often used for controlling several transmitters. The T type network offers absolutely constant impedance but is somewhat more expensive than the modified L type network, shown in figure 2.

Microphone Amplifiers

The output of the average condenser microphone with its associated one stage amplifier is approximately 40 db down from zero reference level (.006 watts), and the output of a good two button microphone is about 30 db down.

In order to provide sufficient voltage to

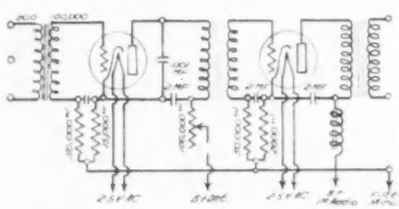


Fig. 6—An excellent circuit for a two-stage microphone amplifier

excite the final high power amplifiers of a public address system it is necessary to introduce several stages of amplification between the microphone and the power amplifiers.

Amplifiers used for this purpose are generally referred to as "microphone amplifiers" and are also called voltage amplifiers.

They usually consist of a two stage transformer coupled amplifier, and have overall gains ranging from 30 to 50 decibels. Microphone amplifiers are available in both AC and DC models and for most purposes the AC model is preferred as it eliminates the necessity for providing heavy "A" and "B" batteries.

Figure 5 shows a very popular type of microphone amplifier which is made by the Samson Electric Co. of Canton, Mass. This amplifier utilizes two 227, and one 280 tube and is arranged to furnish microphone current.

This amplifier has a gain of 47 db at 1000 cycles and will give approximately 0.04 watts undistorted output from an input signal consisting of the normal output of standard two button microphone.

Figure 6 shows a good two stage microphone amplifier circuit for those that wish to construct an AC operated microphone amplifier. The rectifier circuit is not shown as it is the conventional type 80 full wave circuit which it is assumed everyone is familiar.

The circuit shown is particularly stable due to the liberal use of resistors and by-passing condensers which keep audio frequency currents out of any common circuit in which feedback coupling might take place.

Phonograph Pickups

In connection with public address installations it is often necessary that phono-

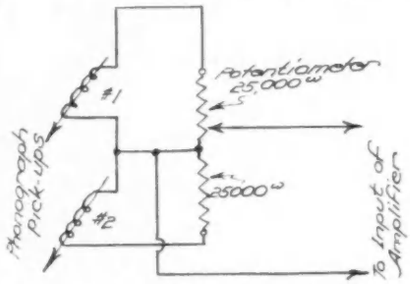


Fig. 7—Circuit for controlling two electro-magnetic pick-ups

graph music be provided over the system during lulls in the regular program. It is therefore necessary to have available a phonograph turntable and motor, and a good electro-magnetic pickup.

If public address service is apt to be sold in locations where commercial power is not available a spring driven motor will be required, otherwise a motor driven turntable should be used. The pickup and turntable should be mounted in a suitable case so as to be readily transported.

Inasmuch as the new long playing records are now available for use on turntables revolving at only 33 r.p.m. it is desirable to utilize a two speed motor so that both 33 and 78 r.p.m. records can be played. Motors coupled with gears which may be shifted to give the two speeds are available at a very reasonable cost. Phonograph pickup units consist of a small soft iron armature which is attached mechanically to the needle holder, and which vibrates between the pole pieces of a polarized electromagnet. The resultant variation in magnetic flux surrounding the electromagnet sets up a small voltage across the terminals of the pickup. This volume output of a good electromagnetic pickup is somewhat higher than that from a microphone.

"Pickups" are connected to the microphone amplifiers through a suitable matching transformer. The impedance of commercial pickups will depend upon the type. Low impedance pickups will be less than 100 ohms, whereas, high impedance pickups will run from 2,000 to 4,000 ohms.

Figure 7 illustrates how the volume outputs of one or two pickups may be controlled.

R. J. BENZEL OF OKLAHOMA CITY PROMOTED

Promotion of R. J. Benzel from general manager of the Southwestern Bell Telephone Company to vice-president of the company was announced from the Oklahoma City offices of the company on March 22. M. J. Stooker, assistant general manager was advanced to the general managership to succeed Mr. Benzel.

Mr. Benzel began his telephone career in 1902 as bookkeeper and cashier of the Southwestern Telegraph and Telephone company at Sherman, Texas. For many years he has been active in the work of the Oklahoma Utilities Association, having been a member of the Executive Board of the Association for the past ten years and at present is first vice-president of the organization.

Mr. Stooker, who succeeds Mr. Benzel, as general manager, graduated from the University of Iowa in 1917. He was with the Northwestern Telephone Company of Omaha, eight years and with the Southwestern Bell Telephone Company at Kansas City and Dallas prior to coming to Oklahoma City as assistant general manager, December 1, 1930.

ADDITIONS FOR FOND DU LAC EXCHANGE

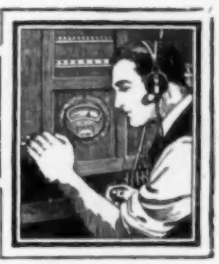
William E. Schroeder, manager of the Wisconsin Telephone company exchange at Fond du Lac, Wis., has announced that an expenditure of $52,000 will be made at Fond du Lac during 1932 for additions, extensions, and betterments of the telephone system.

Of the amount included in the 1932 construction program $27,000 is for additional subscribers' station equipment. Additions to outside plant to provide facilities as required, will cost $22,000. About $3,000 is planned for additional central office equipment.

The telephone company provides service to 8,777 telephones in Fond du Lac.

THE TECHNICAL CLEARING HOUSE

B. C. BURDEN, Editor



Buried Cable Plant

Q. Has the practice of burying lead sheath cable directly in the earth proven satisfactory?

A. The experience of a large number of companies indicates that it is not advisable to bury lead sheath cable directly in the earth except where the cable is encased in a protective coating of ⅛ to ¼ inch of asphalt compound.

Many soils will cause the sheath to become pitted with small holes thus permitting moisture to enter the cable. Soils having a high organic content are particularly bad in this respect.

Guard Arms on Joint Use Poles

Q. Under what conditions should guard arms be placed on joint poles?

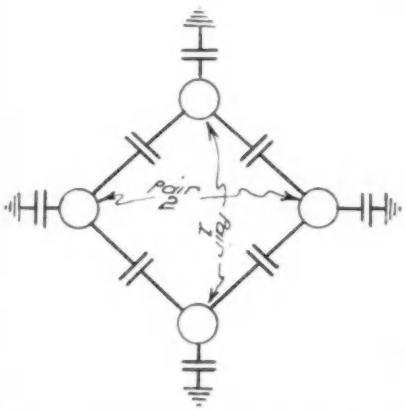


Fig. 1—Capacity relations in a cable quad

A. The Bureau of Standards Handbook No. 10 covering rules for overhead construction specifies that joint poles should be equipped with guard arms where the clearance between power conductors and cable supporting strand is less than six feet.

Transmitter Noise

Q. What causes the "frying noise" often heard in transmitters which are defective?

A. Noisy transmitters are generally the result of pitted electrodes. If the electrodes of a noisy transmitter are carefully examined it will be observed that the surface is covered with a number of dull black spots. Examined under the microscope these spots appear as small craters in the polished surface of the electrodes. The noise is due to the tendency of the carbon granules to form a slight arc at the point where they are in contact with the pitted electrodes. Noisy transmitters can be repaired only by replacing the electrodes.

Capacity Unbalance Tests

Q. What is the purpose of the capacity unbalance tests which are made on quadded toll cable, and how are these tests made?

A. Capacity unbalance tests are made to determine the amount of capacity unbalance between the four wires of a quad in a short section of cable. After measuring the unbalance in adjacent short sections the sections are spliced together so that unbalances in one section are neutralized by unbalances in the adjacent section. Reducing the capacity unbalance in a quad minimizes the crosstalk that would otherwise be experienced from this source.

Figure 1 illustrates the capacity relations between the four wires of a quad. The instrument used to measure capacity unbalance on quadded cable is known as a "capacity unbalance bridge." It consists essentially of a calibrated variable condenser arranged in a bridge circuit, two equal resistance arms, and an input transformer to which is connected a 1000 cycle tone. The four wires of the quad to be tested are connected to binding posts on the bridge and the variable condenser adjusted for minimum tone in the receiver (the receiver is connected across the midpoint of the bridge). The unbalance between phantom and sides, and from side to side can be read directly from a calibrated dial, after the bridge is adjusted.

Vacuum Tube Oscillator

Q. Please describe and explain the operation of a simple vacuum tube audio oscillator utilizing only one tube, which would be suitable for transmission measurements and other applications requiring a fixed frequency source.

A. A very compact and economical oscillator can easily be constructed by following the circuit arrangement shown in figure 2. This oscillator utilizes an ordinary telephone repeating coil, two condensers, a variable high resistance, a low resistance filament rheostat, and small size filament and plate batteries.

The oscillating circuit is the well known "plate feed back" type and operates as follows:

The plate circuit being inductively coupled to the grid circuit any initial voltage surge occurring in the plate circuit will set up a similar voltage surge on the grid. This change in grid voltage immediately affects the current flowing between filament and plate, resulting in an amplified version of the voltage surge appearing in the plate circuit. This amplified voltage in the plate circuit is again fed back to the grid circuit by the inductive coupling between the plate and grid windings and this cycle of events is repeated over and over resulting in the tube acting as an alternating current generator.

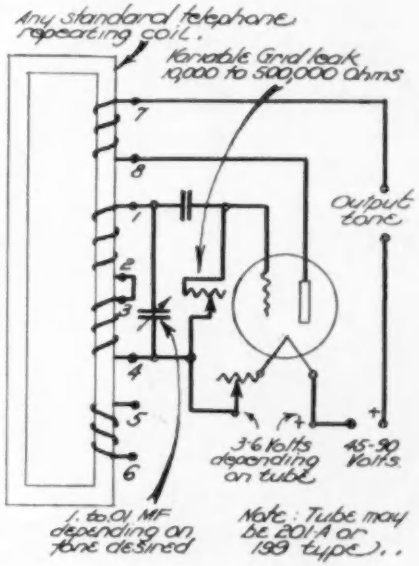

Any standard telephone repeating coil.
Variable Grid leak 10,000 to 500,000 ohms
Output tone
3-6 Volts depending on tube
45-90 Volts
Note: Tube may be 201-A or 199 type).

Fig. 2—Vacuum tube oscillator

It is important that the grid and plate circuits be properly poled otherwise the grid and plate voltages will be out of phase and oscillation cannot take place.

The frequency of the generated tone will depend upon the capacity of the condenser shunting the repeating coil winding 1-4. The higher the capacity the lower the frequency. A unique feature of the circuit shown is the fact that an interrupted tone can be obtained by increasing the grid leak resistance to a high value. The high resistance leak causes the tube to block thus stopping oscillations until the electrons trapped on the grid side of the condenser can leak off through the high resistance. An interrupted tone of a fraction of a second to several seconds can be obtained by this simple arrangement.

Looking north along Freeport Road about a mile north of Sterling, Illinois. These exchange poles snapped off at the base as a result of the heavy coating of ice. New wire had recently been strung, and that prevented the crossarms from breaking, although the wire had many breaks in it.

This picture was taken on March 1, looking north along Prince Crossing Road, just east of West Chicago, Illinois. It looks as though a fabled giant has been using the telephone wires as a skipping rope.

March Came to the Middle West Like a Lion

A French "75" couldn't have done a better job than the heavy sheathing of ice did. Here, the leg of a twenty-five pair cable is holding up six feet of pole, several crossarms, a fifty pair No. 19 gauge cable and the messenger. The open wire and poles which were connected to these crossarms were down for twelve spans.

Suburban Division had ample proof of the storm. In addition to the poles down, about 4,100 were left leaning at precarious angles like the one shown. These poles are being straightened. The picture was taken looking south along Ingalton Avenue, West Chicago.

No, this is not a poor trim job. Branches of these trees broke off under the weight of the ice. And look where the telephone wires went. Some of the icicles on the wires measured two inches in diameter. Taken near West Chicago.

Some additional cleaning for the repairman before he can get to his trouble. Scenes like this were common throughout the damaged area, and it was nearly always the same story—falling trees dragging wires and poles down with them. Corner Maple Street and Grand Lake Boulevard, West Chicago.

Courtesy of The Bell Telephone News.

News From the Field

Employes of the Western Telephone corporation, with headquarters in Salina, Kans., have been engaging in the distribution of preferred shares of Western Power Light & Telephone company for a two weeks' period ending March 5.

The Omaha telephone exchange this year is celebrating its 53rd birthday. First established in 1879 with 140 subscribers, the end of 1931 found 66,842 telephones in Omaha. The Nebraska Telephone company, former owners of the Omaha exchange, in 1921 became part of the Northwestern Bell Telephone company, operating in Nebraska, Iowa, Minnesota, and North and South Dakota.

A crew of eight men have just completed laying a new 38-pair special toll cable in New Ulm, Minn., which connects with the Tri-State Telephone and Telegraph company long distance exchange located in that city. The new cable was laid underground and displaces the former high line. The cable, with its 38 pairs of wires, is expected to be ample to carry all incoming and outgoing tolls in every direction, for some years to come.

Business men of Mt. Carroll, Ill., have formed the Mt. Carroll Mutual Electric company and received a charter, and expect to operate a gas, telephone, and electric plant in the city.

The Illinois Bell Telephone company at La Grange, Ill., is experimenting with a new form of burglar alarm. By the new system, any telephone subscriber who has burglars in his house can signal the operator to this effect by means of lifting the receiver from the telephone. When the operator fails to receive an answer to her "Number, please," she will report to the police.

The Allegany County Telephone company and the Cattaraugus Union Telephone company, serving Wellsville, Pa., and a number of other towns in the two counties, have been taken over by the New York Telephone company, according to an announcement from Harry E. Keller, Cuba, Pa., president of both Allegany and Cattaraugus companies.

The principal telephone companies of the United States earned an operating income of $252,256,252 during the 11 months ended with November, 1931, a gain of 1 per cent compared with the income of $249,668,275 reported for the corresponding period of 1930, according to a tabulation made public by the Interstate Commerce commission, February 3. Expenses fell off during the 11-month period by 4.4 per cent, while total revenues declined 2.5 per cent.

The Southern Telephone company has announced a $20,000 improvement and expansion program for Gilroy, Calif.

The expenditure of $11,613,125 for new construction throughout the state was authorized by the board of directors of the New York Telephone company at the regular monthly meeting held March 23, according to an announcement made today by J. S. McCulloh, president. This brings the total appropriations for the first three months of the year to $16,751,900, of which $14,122,335 has been provided for the extension of facilities in the metropolitan area.

The Wisconsin Telephone company has announced additions and replacements to the Watertown exchange which will require an expenditure of $23,000.

The new Bureau County Co-operative Telephone company, in Illinois, which has been in process of organization for several months, since the Illinois Allied Telephone company raised the rates last March, has received a charter from the secretary of state in Springfield, Ill.

Increased telephone rates to be charged by the Chenango and Unadilla Telephone company in portions of Madison, Otsego, Herkimer and Chenango counties in New York, have been approved by the public service commission. The new rates are considered reasonable since the company has recently installed metallic circuits and 24-hour service.

The Lincoln Telephone and Telegraph company, Lincoln, Nebr., has since December been carrying on a three-fold construction program in connection with its Fairbury, Nebr., plant. The project consists of replacements and additions in the cable distribution and lines in Fairbury, enlargement and rearranging of the switchboard to make room for two additional toll positions, and the building of a new toll line from Fairbury to Western.

Construction of an additional 52 miles of overhead cable on the proposed Chicago-Milwaukee-Twin Cities improved long distance line is planned this year by the Wisconsin Telephone company.

Because the Farmers Mutual Telephone company at Dysart, Iowa, has a substantial amount in reserve, a reduction of switching fees has been agreed upon, reducing the cost from $10 to $7.50 a year.

The city of Roswell, N. M., plans to file suit against the Mountain States Telephone and Telegraph company to test the right of the company to operate there. City records show there has been no telephone franchise granted since 1919. The suit is a step in the move to obtain a reduction in telephone rates for Roswell subscribers.

Approximately 1,100 telephones were temporarily put out of commission at Salem, Ind., last month, following a fire which destroyed the exchange of the Southern Indiana Telephone and Telegraph company, with a loss of about $20,000.

The last week in March found fifty crews of linemen and helpers and a large force of engineers of the Chesapeake and Potomac Telephone company of Baltimore City working valiantly to restore service to the 13,700 telephones and 600 long distance lines in every section of Maryland which were put out of commission by a severe snow and wind storm.

A notable addition to the Minneapolis skyline which is rearing its 26 stories into the clouds, is the new home of the Northwestern Bell Telephone company, which will be completed soon.

CUT WORKING TIME

The American Telephone & Telegraph company has issued the following statement:

"In order to continue employment for the maximum number of employees and in line with action already taken by its long lines department, the working time of all employees of the general department will be reduced by one-half day a week beginning May 1.

CLARK JOINS KEARNEY CORPORATION

Tom C. Clark joined the sales organization of the James R. Kearney corporation on January 7, 1932, as field contract engineer. Mr. Clark is particularly well known in the electrical field because of his prior connections. The news of his new connection will also carry with it the hope of his many friends for his future success.

Mr. Clark received his schooling at Missouri University and Washington University. He was connected with the Union Electric Light & Power company at St. Louis for many years in the estimating division of the electrical distribution department and also in the construction department as division superintendent.

Advertising for Independent Companies

United Trust Company Has Department Which Provides Advertising and Publicity Material at Minimum Cost to All Independent Companies Wishing to Increase the Number of Their Subscribers, Extension Stations, and Toll Calls; This Service Proving Very Popular

Recently the most noticeable and general trend in the telephone industry has been the tendency to emphasize advertising and publicity. This has been evidenced at state and national association conventions, where the necessity of widespread advertising campaigns and sales contests has been advocated repeatedly, in order to stimulate the continued growth and expansion of the telephone industry.

The Bell System perceived the importance of reminding telephone subscribers and potential subscribers of the many services and conveniences and pleasures which could be provided via the telephone, and advertisements depicting these advantages have appeared in leading national publications for some time.

Independent Advertising

Here and there Independent companies have endeavored to plan an advertising campaign, either to be run in the local newspaper, or to be distributed direct by mail. However, since the advertising and publicity man has only recently been considered an important part of the telephone business, and since many of the smaller Independent companies have not yet found it expedient to include him in their budget, a constantly increasing number of Independent telephone companies are securing their advertising material from the advertising service provided by the public utilities department of the United Trust company of Abilene, Kans.

Organized for the most part by men interested in public utilities, the United Trust company has emphasized its public utilities department and has provided a complete service for the Independent utility operator along lines of management, engineering, accounting, financing, operation, publicity, and legal problems.

The United Trust company, fully as much as the Bell System, has been a leader in this modern plan of educating present and potential telephone subscribers to the many possible uses of the telephone.

They saw the advantages which could be gained from a well-planned advertising service, and so made such a service available to all Independent companies. Because it is the only organization known to have done this, it may well be termed the international headquarters for Independent telephone company advertising material.

Use It More!
One ladder may serve the whole neighborhood But you need a of your own
COSTS BUT LITTLE
He can't have a But YOU can!
You can borrow a cup of sugar from a neighbor But you need a of your own
Your is your Fire Alarm Insurance
Midnight or Noon ALWAYS at your service
You may Borrow your neighbor's lawnmower But you need a of your own
Why walk to talk? Order an extension
By your Easy Chair is a good place for an extension

And so it has become. Inquiries as to the service and orders for samples have been received from a dozen foreign countries, and from almost every state in the Union. The Trust company has contact with 2,200 Independent companies in the United States, all of which have 500 or more subscribers.

Popularity of United Service

It is interesting to note that the popularity of Independent telephone advertising has gained such momentum that more requests for advertising material were received by the public utilities department of the United Trust company in the first two weeks of February, 1932, than had been received in the entire year of 1931.

The advertising service includes several little booklets which may be mailed direct to telephone customers or prospects, maps of advertisements to be placed in the local newspapers, blotters, envelope stuffers, and leaflets.

One of the leaflets contains a number of cartoons based on the theme, "It isn't a home without a telephone," and is used to help develop more stations. Another leaflet glorifies the pleasures of extension telephones in convenient locations. One booklet is called "Your Telephone—Use It More," and lists and describes and depicts many and varied uses for the telephone. Still another one, also containing a series of cartoons, cleverly illustrates the value and convenience of long distance messages.

Set of Sixty

Of the telephone advertisements planned by this service to be placed by individual companies in their local newspapers, perhaps the most interesting and popular is the "Set of Sixty." This set includes 60 small cartoon advertisements illustrating the benefits of the telephone. These cartoons are approximately 2 by 4 inches and will fit into one column of any newspaper. A telephone with the slogan "Use It More" appears at the top of each cartoon. It is suggested that the companies wishing to use these cartoon advertisements, run one each week for 60 consecutive weeks, or select the 52 cartoons they like best and run an advertisement in their local paper every week for a year.

There are also several other series of advertisements, one advocating extension telephones, another long distance, and another series of 26 small advertisements similar in size and copy to the Set of Sixty, except that they are not cartoons.

Independent companies interested in this service can secure samples and an order blank by writing the public utilities department of the United Trust company, Abilene, Kans.

Suttle Equipment Co.

FACTORY AND MAIN OFFICE
Lawrenceville, Illinois

Offers You Four Exceptional Services

Transmitter Renewals

Includes refinishing, nickel or black baked enamel, recharging, complete overhauling. Guaranteed as efficient as new. Packed in separate cartons. Either common battery or magneto.

Prices Without Backs	With Name Plate on Front	Without Name Plate
10 to 50, each	49c	47c
51 to 100, each	44c	42c
100 or more, each	39c	37c

See Page 26, Suttle Salesman, for details.

Subscriber Billing Supplies

All standard styles of subscriber bills on good quality 20-pound bond paper. Toll statements included. Fit window envelopes.

Prices	Subscriber Bills	Window Envelopes
1,000	$4.50	$3.00
2,000	7.00	5.40
5,000, per M	2.30	2.10

Combination Prices:

2,000 Bills, 2,000 Envelopes $10.50
5,000 Bills, 5,000 Envelopes 20.50

See Pages 32-33, Suttle Salesman, for details.

Rewinding Telephone Coils

Old wire removed, insulation replaced, carefully rewound with highest grade wire, accurately tested and guaranteed.

Ringer Coils
- 500 ohms, each 40c
- 800 ohms, each 45c

Induction Coils
- Local Battery, each 30c
- Common Battery, each 35c

Telephone Receiver Coils, each 30c
Generator Armatures, 3-bar ..... 58c to 82c

See Page 27, Suttle Salesman, for details.

Telephone Rebuilding

Telephones re-manufactured from your old instruments and defective parts. Metal parts refinished, new cabinets, new wiring, new cords, shells, mouthpieces, terminals, etc., to your own specifications. Just like new. Guaranteed.

Wall Compacts, each ..... $6.00 to $8.00
Desk Sets, each ..... 6.50 to 8.50
Desk Stands Only, each ..... 3.00 to 5.00

See Pages 21-22, Suttle Salesman, for details.

Can You Afford It?

Can you afford to pass up these services at these prices? You will find complete information on them, as well as numerous other similar values in our new 1932 Suttle Salesman Catalog. If you have not received a copy, just fill in the coupon and mail at once.

Send Me the 1932 Suttle Salesman

To: Suttle Equipment Co., Lawrenceville, Ill.

Listing dozens of exceptional values as advertised in the Telephone Engineer.

Company .....

Address .....

Title .....

Identify your inquiry to advertisers by saying—"As shown in TELEPHONE ENGINEER"

Telephone News From the Southwest

Notes of Telephone and Utility Interests in the Central Southwest Which Previously Were Reported for Transmitter and Electrical Journal, a Regional Magazine of that District Which Has Been Absorbed by TELEPHONE ENGINEER, Appear in the Following Columns

Observations From Oklahoma

Telephone people played a prominent part in the fourteenth annual convention of the Oklahoma Utilities Association held at Tulsa, Oklahoma, March 8 and 9. Approximately 700 executives and employees of telephone, electric, gas and electric railway utilities and of appliance manufacturing companies registered at the convention.

New officers elected at the convention were R. J. Daugherty, Bartlesville, president; R. J. Benzel, Oklahoma City, first vice president (re-elected); H. B. Cobban, Miami, second vice president; W. R. Emerson, Oklahoma City, treasurer (re-elected); E. F. McKay, Oklahoma City, manager (re-elected). New representatives on the executive board were elected to fill unexpired terms on vacancies from each of the six divisions. A. G. Davidson of Frederick was elected chairman of the telephone division and C. G. Gardner, Sentinel, and R. J. Benzel, Oklahoma City, were elected as members of the executive board representing the telephone division. The latter was re-elected.

The telephone division held separate meetings during each day of the convention with the exception of the morning of the first day. C. G. Gardner, as retiring chairman of the division presided over each of the meetings.

In the First Aid contest, which was held on the evening before the opening session of the convention, the Safety team of the Southwestern Bell Telephone Company won second place in the First Aid contest in which four teams participated.

* * *

The Southwestern Associated Telephone company is constructing a new telephone system at Arnett, Okla. When completed the new exchange will be among the most modern in towns under 2500 population, according to J. M. Keffer, district manager of the company.

* * *

Employees of the Oklahoma Telephone company, on March 25, held a meeting in Tulsa, Okla., for the purpose of discussing company business. J. W. Walton, president of the Oklahoma Telephone Company, was in charge of the meeting and was assisted by J. L. Zeig, general superintendent. Dr. W. B. Boyd of Chicago and A. R. MacKinnon of Kansas City, were present and spoke to the employees making valuable suggestions relative to securing new telephone business and giving satisfactory telephone service. Forty-seven employees of the company were present.

* * *

For the tenth consecutive year the Oklahoma Utilities Association has been conducting annually a series of district telephone meetings. These have grown in interest and attendance until they have become one of the principal features of the work of the association. The Telephone Division during the recent convention of the association, at Tulsa, Oklahoma, decided to hold another of these series during 1932. The first will be at Guymon, Oklahoma, on May 3, under the auspices of the Southwest Telephone Company. In addition to an interesting program of addresses and entertainment general discussions will be held on several subjects including rural line telephone service, public relations, commercial and traffic practices, accounting, construction methods, local and long distance service and maintenance of plant.

MARCONI INVENTS RADIOPHONE FOR USE IN A HOME.

Genoa.—Guglielmo Marconi has developed a successful ultra short wave radio telephone, capable of both receiving and sending, according to witnesses who attended a test conducted by him recently. The test was over a distance of eight miles on a 52 centimeter wave.

Baron Cencio Masson, mayor of Levanto, who was among the witnesses, said the new radiophone could establish contact with an ordinary telephone system. Hence a person with the radiophone could converse with any one on a wire telephone circuit.

The inventor, seated at the villa of a friend, conversed for ten minutes with Engineers Ricardi and Mathieu of the Marconi company at Villa Gualino, eight miles away. Witnesses said reception was so clear that they all heard the voices of the engineers. The spectators said the apparatus was compact and that with some elaborations it could be used in an ordinary home.

CONVENTION SCHEDULE

Kansas Telephone Association, Jayhawk Hotel, Topeka, April 19-20.

Wisconsin State Telephone Association, Loraine Hotel, Madison, April 26, 27, and 28.

United States Independent Telephone Association, Southern District, Bristol, Tenn., May 4, 5, and 6.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 11 and 12.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 17, 18, and 19.

Up-State Telephone Association of New York, Jamestown Hotel, Jamestown, May 25, 26, and 27.

North Dakota Telephone Association, Hotel Powers, Fargo, May 26 and 27.

MRS. GEORGE W. RODORMER UNDERGOES OPERATION

Mrs. Geo. W. Rodormer is recovering from a serious operation which was found necessary recently. As soon as she has sufficiently recovered from this operation it will be necessary for her to again undergo a minor operation before she can regain her health, physicians say. The many friends of the Rodormer family throughout the country hope for an early and permanent recovery for Mrs. Rodormer.

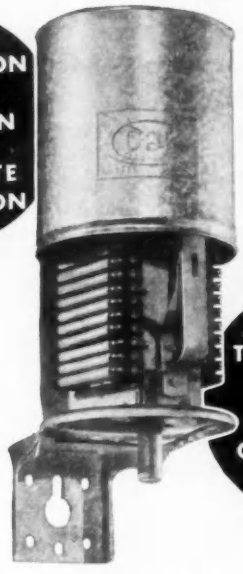
ORDERS STROMBERG EQUIPMENT

Sulphur Telephone company of Sulphur, Oklahoma, has ordered a four position No. 13 unit type Switchboard from the Stromberg-Carlson Telephone Manufacturing company for its Sulphur exchange. The board will be equipped with 600 Central Energy and 30 toll and rural lines. It will be complete with terminal, power and machine equipment.

Cook Pole Cable Terminals

PERFECT TERMINATION AND INSULATION ◆ ADEQUATE PROTECTION

COOK



BUILT OF TONCAN IRON ◆ BUILT TO OUTLAST THE CABLE

IF IT'S WORTH PROTECTION
IT'S WORTH COOK PROTECTION

MANUFACTURED BY
COOK ELECTRIC COMPANY
2700 SOUTHPORT AVENUE CHICAGO, ILLINOIS

Help your operators cut toll losses

In spite of the world-wide reputation of the Calculagraph, there is still an occasional telephone manager who appears not to appreciate in full the importance of this instrument as a safeguard against toll charge losses.

He is apt in all good conscience to place the blame on his toll-board operators—which is hardly fair, when the Calculagraph is so easily available. Operators with nothing but a time-of-day indicator and a pencil cannot be expected to provide 100% accuracy in their busy work. But you can demand 100% accuracy from the Calculagraph *at all times*—and get it!

With utmost precision, the Calculagraph mechanically computes and prints ELAPSED TIME. A pull of the handle clearly and indelibly stamps *on the toll ticket* the time of day of each call, also the actual ELAPSED TIME the circuit is in use, for any number of calls. No arithmetic by pencil—no diversion from other duties—no chance of error—the Calculagraph is easily and quickly operated while conversing with either the calling or answering party. The Calculagraph is now supplied in either the well-known spring-driven model or an electric-driven model operated by electric impulses from a master clock (24 or 48 volts), or by self-starting synchronous motor (60-cycle A. C.). Prices and detailed information on request.

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CALCULAGRAPH
THE ELAPSED TIME RECORDER

WHAT'S one more gale *to Copperweld Insulated Drop Wire!*

Where real staying power is needed—resistance to storms, snow, heat, moisture, high winds—Copperweld more than fills the bill.

This twisted pair insulated drop wire is doubly fortified against *all* that the elements can offer. Stronger than either copper or steel alone, and quality insulated and weatherproofed to Graybar specifications, no wonder Copperweld stands the gaff.

What's one more gale—to Copperweld!

GraybaR

Distributed by GraybaR

THE GRAYBAR TAG—SYMBOL OF DISTRIBUTION

Telephone Activities in Foreign Countries

Dispatches from Abroad Keep Telephone Men in United States Constantly Informed Concerning Telephony of the World; Domestic Telephone Problems Oftentimes Can Be at Least Partially Solved by Watching the Outcome of Experiments Made Elsewhere

Great Britain Telephone Plans for 1932

The average number of telephone calls per week in Great Britain and Northern Ireland in 1931 reached a total of about 14,000,000, and the General Post Office is going ahead with improvements in service and equipment which it is anticipated will further increase the use of the telephone.

Telephone facilities are being advertised in newspapers and paid lecturers are touring the various districts of the country to bring these facilities to the attention of householders, and are visiting the schools as the best means of approach in the rural districts.

Other items to be given attention in 1932 are: extension of the London telephone area from 750 to 1,000 square miles; completion of the 15 new London automatic exchanges; the "on demand" service to be extended to Bristol, Leeds and Manchester; improvement of trunk and toll call facilities; addition of 538 street telephone boxes to the 2,700 in the London area; and extension of the area of suburbs in which calls may be counted as "local."

Extend Colombian Telephone Service

Telephone service between Bogota and Atlantic Coast cities, Barranquilla, Cartagena, and Santa Marta, will be in operation in the near future, according to announcements made by the Minister of the Mails and Telegraphs. This will be made possible through arrangements entered into with the Marconi Wireless company, Ltd., and the Bogota Telephone company, Ltd., through combining the wireless and land facilities of these companies.

Establish Television Company in South America

As a result of approximately a year's study of the possibilities of television, a company has been formed in Argentina under the title of Baird Television, Ltd., for the purpose of exploiting in Argentina, Uruguay, Brazil, and Chile, all of the patents of the Baird Television company, Ltd., of London. This company intends to establish in the near future a combination television and radio telephone service in these countries. In Argentina this service will be established in conjunction with the local broadcasting station.

Telephone Developments in Yugoslavia

At present Yugoslavia has direct telephone service to Austria, Italy, Greece, Hungary, Czechoslovakia, Germany, Switzerland, France, Rumania, Poland, Netherlands, Free City of Danzig, Belgium, and the Vatican State.

During the night of September 5 the new automatic central station at Belgrade was put in service. The station was under construction for a year. It is of the most modern type with 11,000 numbers. An interurban telephone switchboard of modern type was also ordered, with 100 lines and 10,000 instruments, and the systems of underground cables was greatly expanded. The total cost of the station was near $968,000.

Swiss Telephone Subscribers Enjoy Radio

A system has recently been inaugurated in Switzerland whereby telephone subscribers can enjoy radio broadcasts without actually owning a radio set, but rather through a device attached to their telephone instrument. The charge for this radio service is only approximately fifty cents a month. Together with a telephone it makes the fee for both equal to $2.17. An attempt is being made by the telephone administration to make this radio service an inducement to non-subscribers to install a telephone in their houses.

Reduce Rates in Portuguese East Africa

The colonial postal administration has announced a general reduction in telephone rentals. Effective January 1, 1932, private subscribers are paying a basic rate of $29.20 a year for not more than 600 calls, and business subscribers are paying a basic rate of $43.80 for not more than 900 calls. Within the past year or two the equipment has been greatly improved. Service to South Africa was opened December 1, 1931.

New Radiotelephone Service for Brazil

Direct radio telephone service was begun between Spain and Brazil, and between Portugal and Brazil recently. Telephone communication between Madrid and Rio de Janeiro is established by means of the short wave radio station of the Compania Telephonica Nacional de Espana at Madrid and the radio station of the Companhia Radio Internacional do Brasil at Rio. The radio circuit has a length of 8,100 kilometers. The land line between Madrid and Lisbon covers a distance of 667 kilometers. The new direct telephone service between Spain and Brazil is expected to help greatly in speeding up and increasing commercial transactions between the two countries. The extension of the service to Portugal provides an added tie between the two countries speaking the same language and having intensive commercial relations.

Radiotelephone Service Between Moscow and Tashkent

A radiotelephone service between Moscow and Tashkent has started operation. The installation is equipped with a broadcaster multiple with a capacity of 60 kw. Four telegraph transmitters with a capacity of 20 kw. on short waves and one machine transmitter of 150 kw. on a long wave are working as well. These transmitters make it possible to have direct radio communication from Moscow with Khabarovsk, Sverdlovsk, Irkutsk, Tashkent, Alma-Ata, Novosibirsk and also New York.

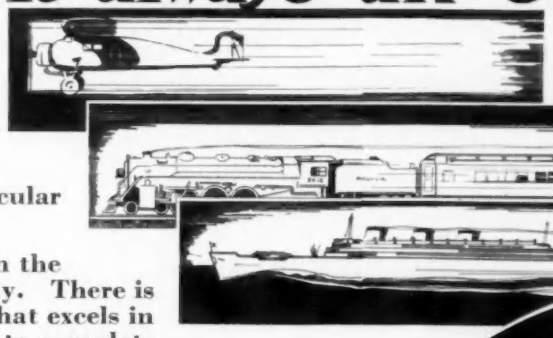
Operation of Telephone System in Mauritius

The telephone service of Mauritius, Madagascar, is furnished by the Oriental Telephone and Electric company, Ltd., of London, operating under a 30 years' license issued by the Mauritius government in 1911. The island is divided into nine districts, all connected by telephone lines. There are five exchanges located in the most important centers, the chief one being at Port Luis, the capital.

Overseas Telephone Service Extends to Hawaiian Islands

Hawaii and the North American mainland were linked by regular telephone service recently. The new service inter-connects all Bell and Bell-connecting telephones in the United States, Canada, Cuba and Mexico with those in the principal islands of the archipelago. It marks the first time that the United States and one of its outlying dependencies have been joined by direct voice communication.

There is always an ULTIMATE ~



The fastest plane

The fastest train

The fastest ship

The SUPER-SERVICE switchboard....

There is always one train, one aeroplane, one ocean liner that holds the speed record for its particular field.

This is also true in the realm of telephony. There is one switchboard that excels in the time required to complete calls and in the elimination of errors.

The reason for the achievement of this excellence is found in the features that are incorporated in the Stromberg-Carlson Super-Service Switchboard.

- Operator's Master Ringing Control
- Calling Subscriber's Ringing Control
- Reverting Busy Test with Tone
- Operator's Listening Indication
- Instantaneous Ringing Cut-off
- Instantaneous Ringing Start
- Operator's Secret Service
- Visual Ringing Indication
- Advance Plugging-In
- Reverting Call Ringing
- Audible Busy Test
- Positive Supervision
- Non-Ring Signaling
- Emergency Ringing
- Operator's Cut-In
- Machine Ringing
- Flash Recall
- Dark Keyboard
- Operator's Bar
- Ringing Tone
- Call Registration

All these features are associated with the simplified Stromberg-Carlson Super-Service keyboard to assist the operator in furnishing the ultimate in telephone service.

Stromberg-Carlson engineers will gladly send you a bulletin explaining in detail why the Stromberg-Carlson Super-Service Switchboard is the most efficient and economical telephone switching equipment on the market.

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Write for Bulletin 117

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Identify your inquiry to advertisers by saying—"As shown in TELEPHONE ENGINEER"

Kellogg Introduces New Bronze Drop Wire

This Superior Wire Which Is Available at Less Cost Than Ordinary Drop Wires Will Be Welcomed for Spring Construction; As a Conductor This Super-Bronze Drop Combines Great Strength and Conductivity with Complete Freedom from Rust or Corrosion

Of outstanding importance to the telephone industry at this time, is the introduction of Kellogg *Super*-Bronze Drop Wire. The perfection of a better drop wire at a lower cost is a bit of news that will receive an unusually warm welcome from telephone men everywhere. Especially so, since this superior wire is now available for spring construction work that will soon begin. It is the only conductor known to the industry that combines the three features of great strength, conductivity and complete freedom from rust or corrosion.

Drop Wire

Kellogg engineers announce the new *Super*-Bronze as the finest drop wire conductor obtainable anywhere because:

1. It has a tensile strength of 200 pounds—the strongest bronze drop wire conductor ever made.
2. It is the perfect drop wire conductor—telephone engineers have always considered bronze as the best conductor for drop wire purposes because it is the only conductor that meets every service requirement.
3. It is exceptionally low in price. It actually costs less than inferior drop wires that do not have a solid bronze conductor; that do not have 200 pounds strength; or any of the other features that set *Super*-Bronze apart as the most economical "buy" in drop wire.
4. It will not rust or corrode—either after scraping or at exposed ends. Joints once made stay—without developing transmission noises or losses.
5. It will not deteriorate under any climatic condition.
6. It is even smaller in diameter than the usual drop—only 18 gauge.
7. It is lighter in weight. Consequently longer lengths can be strung with safety.
8. Its smaller diameter and greater strength are almost a certain guarantee against being brought down by sleet, wind, or snow.
9. Its flexibility makes it easy to work with. It holds its form—a fact that saves the lineman's time.
10. The conductivity of bronze is well known—it is more than sufficient to meet maximum requirements for good commercial transmission.
11. When taken down, after having served a long, useful life, it has a reclaim value.

Specification Rubber

Kellogg engineers contend that the new Kellogg specification rubber is better than that found in other drop wire. It is certain to give the best insulation to the conductor and a much longer life to the wire as a whole because:

1. The insulation has a minimum content of 30 per cent pure rubber, compounded by an exclusive Kellogg formula with special anti-oxidants.
2. Recent tests made by unbiased experts in the laboratories of a prominent midwestern university conclusively proved that Kellogg insulation has at least 50 per cent longer life than even the best of four other competitive drop wires which were likewise subjected to a "Life Test." In other words, Kellogg *Super*-Bronze Drop Wire will give you 50 per cent longer service. This point alone enables the telephone company to save a considerable sum of money by standardizing on this new and better product.
3. The insulation has great strength and toughness—a tensile strength of 1,000 pounds per square inch.
4. It is applied by the tubing process without seams.
5. It is thoroughly vulcanized—the insulation adheres firmly to the conductor and protects it completely.
6. To assure longer life and even greater protection, the wall thickness of Kellogg insulation is 3½ per cent greater than that generally recognized as sufficient for drop wire purposes.

Applying Braid

An improved method of applying the braid over the insulation is another feature of Kellogg *Super*-Bronze Drop Wire that helps to insure maximum protection, positive weatherproofing, and greatest resistance to wear.

1. A tough, two-end, unbleached cotton braid is woven over the wire with a special lay that gives the insulation maximum protection.
2. The new weave and finish of the braid offer greatest resistance to mechanical injury or abrasions.
3. Tested weatherproofing and protecting compounds are applied by an improved process to assure positive and thorough saturation.
4. A special finishing and preserving compound is applied over the weatherproofing compound to fill all interstices in the braid and enable the finished wire to take a high polish which further aids in protecting the insulation.
5. Neither the weatherproofing nor finishing compounds will in any way harm the conductor, insulation or braid.
6. Even though subjected to temperature of 125° Fahrenheit above zero, or 10° below zero, the weatherproofing compounds will not melt or crack.

These numerous features indicate a drop wire of unusual merit. Prominent telephone engineers who have already tested this wire, expect that it will soon become the standard in the Independent field.

Complete specifications and samples of Kellogg *Super*-Bronze can be obtained from the Kellogg Switchboard and Supply company, Chicago.

GEORGE RODORMER ABSENT FROM CONVENTION

Seems like a telephone convention is not complete without George Rodormer present. He has been a permanent fixture at conventions since the organization of the Reliable Electric company some two decades ago. But because of the serious condition of Mrs. Rodormer, George refuses to leave her long enough to even attend a convention. He is always missed for he usually served on entertainment and banquet committees at the different state as well as national conventions.

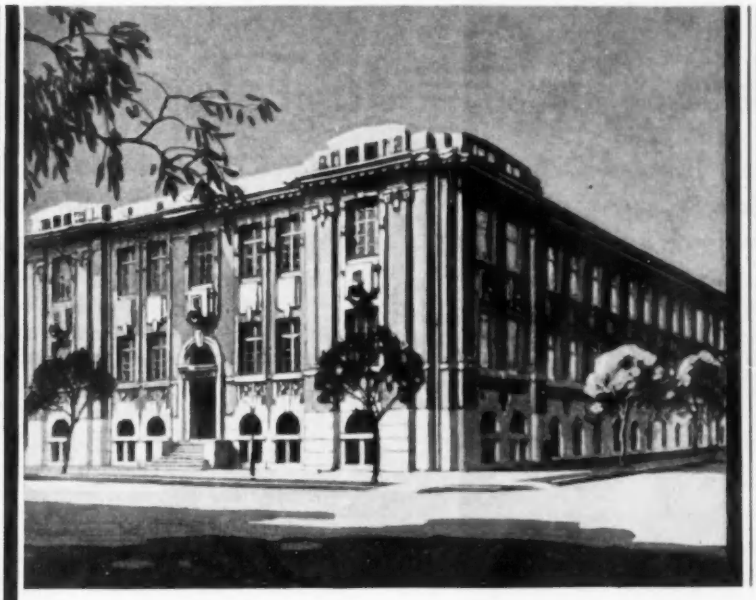
ROCHESTER TELEPHONE CO. TO SPEND $16,000

Expenditure of $16,000 for underground and aerial plant additions and removals has been approved by directors of the Rochester Telephone corporation, Rochester, N. Y.

The expenditure includes the insulation of 3,500 feet of wooden ducts, building of five manholes, and placing and splicing of 11,000 feet of cable. The project was authorized to provide increased facilities for growth, to reduce cost of connecting new business and to eliminate certain unsatisfactory plant conditions, according to William J. O'Hea, secretary.

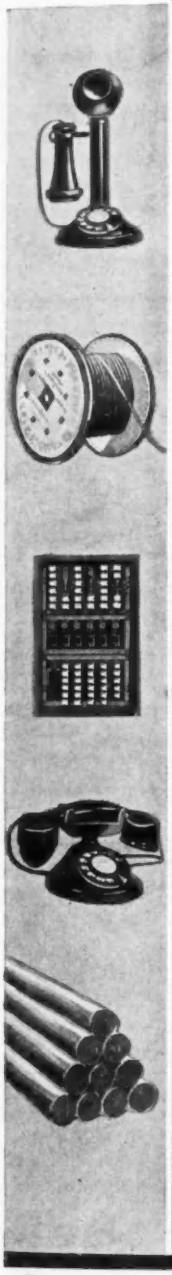
BILL WOODBURY DIES AT ROCHESTER

Bill Woodbury, nephew of Ben Woodbury, passed away early in April at his home in Rochester, N. Y. Few people in the telephone industry knew Bill Woodbury as he was not interested in this line of work, but his uncle, Ben Woodbury, manager of telephone sales for the Stromberg-Carlson company for several years, is well known throughout the country.



DAIREN, MANCHURIA

This Handsome Telephone Building at Dairen, Manchuria, is Equipped with Strowger Automatic Dial Equipment Manufactured by Automatic Electric Co. of Chicago. Strowger Equipment as Manufactured in the Strowger Factories at Chicago and Liverpool, Is Used in Other Large Cities in Manchuria.



In Far Away Manchuria...

AT THE farthermost corner of China, and bordering the vast expanse of Russia, Manchuria occupies strategic territory. In this natural trading center, several great cities have grown up, noted for their commercial and industrial activity. Of these the largest and most important is Dairen, whose excellent transportation facilities, both by sea and by land, have contributed largely to its progress.

In Dairen, as in other important cities throughout the world, telephone service of the highest order is provided by Strowger Automatic Dial equipment. Regardless of local conditions, climatic or otherwise, this modern apparatus renders the highest type of service at minimum cost. In both quality and performance it is backed by over forty years of manufacturing and operating experience. Telephone administrations are urged to submit their problems to us. Tenders on Strowger equipment —or on manual boards, cables, batteries, poles, or any item of telephonic equipment—will be gladly furnished without obligation.

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Associated Electric Laboratories, Inc., Chicago, London, Antwerp

Finding Water Trouble in Telephone Cables

E. S. Stewart, of Stewart Brothers, Ottawa, Illinois, Here Describes Methods of Testing Cables for Trouble, Explains How Water Trouble Can Be Differentiated by Other Kinds of Cable Trouble in Testing, and Even How Almost the Exact Location of That Trouble Can Be Ascertained

There are still many who have difficulty in locating dampness or water leaks in paper insulated telephone cable by the exploring coil or induction method.

For the benefit of those in the field who have to locate this kind of trouble the following suggestions and explanations are made.

If the exploring coil is not properly constructed or the test properly set up the success of the test will be doubtful.

However, if the rules of the test are carried out and proper testing apparatus used, the location of wet spots and high resistance trouble can be accurately made.

These are many things that at first thought should not affect the test, but upon giving some study to these conditions one can see where the little things have much to do with the test.

Clear Up Ground Trouble

A very important condition to watch in all cable plants is to see that all scattered trouble, especially grounds, are cleared up at once. Two very good reasons for this are, first, that many times a ground caused by a bullet or a burn causes the lead armor or sheath to be punctured and the first rain will put the whole cable out. The other good reason is that any pair in a cable that has a ground on it, that passes through any wet spot that might occur, will carry the tone to the dead ground caused by the bullet or burn and the tone on this grounded pair will be plainly heard beyond the wet spot, it being understood that the dead ground is beyond the water in the cable.

You can readily see that if there were five or six grounded pairs in a cable that these pairs can and will carry the tone beyond the wet spot.

If all grounds that occur in a cable plant are located at the time they appear you will have fewer wet spots and what you do have can be more easily located.

The accompanying sketch shows by the dotted lines how the tone will scatter and be heard past the wet spot and to the dead grounds that have been allowed to accumulate in the cable.

Cable Testing

One of the most important points in cable testing is to set up the test so that all of the current sent out on the pair under test will return on the armor or sheath of the cable that is wet.

Always connect one post of the cable tester directly to the armor or sheath, making sure that the lead has been cleaned bright at the point of connection.

Never connect to any cable armor or sheath other than the one you are testing in.

Connecting the other post of the cable tester to one of the pairs shows the heaviest leak. Sometimes more than one pair can be connected to this post, but whenever possible only use one pair.

A good plan also is to connect as many of the wet pairs as is practical to the cable armor at the point where the cable tester is connected.

The exploring coil should be so made that when held on the bottom of the cable, or on the side directly away from the messenger, that the coil will balance the current, that is, on the armor of the cable. This is most important.

Where to connect the cable tester to the wet pair or pairs is another important point.

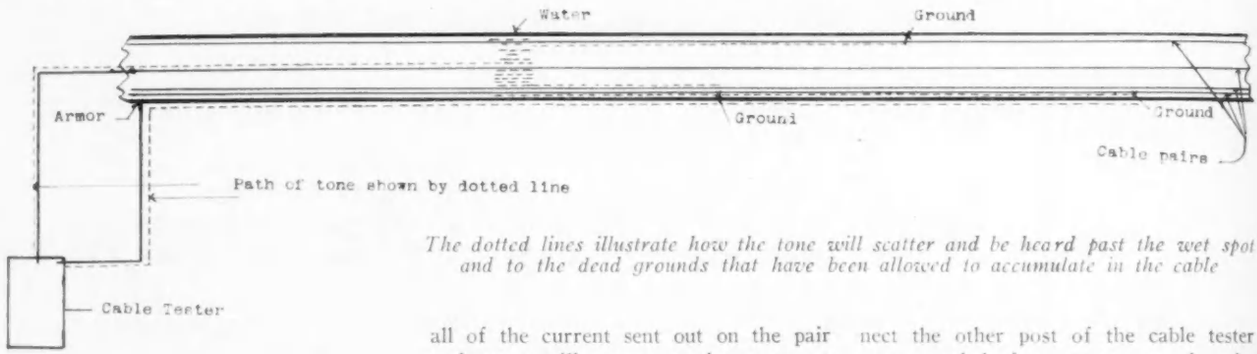
Two Methods of Testing

If the lines working in the cable that is wet are long rural lines or if they are one wire and ground for return or if the bells are grounded, then it is a good plan to test from the out end of the cable or can top terminal. In this case ground several of the wet pairs to the armor as before suggested.

If the lines in the cable are short in length or can be disconnected at the can, then test from the office. Always disconnect the line and drop or relay from the pair connected to the cable tester.

Two tests will be set up following the suggestions just made.

The first test will be made from the office end of the cable as follows: Connect the pair showing the heaviest water leak to one post of the cable tester. Connect the other post of the cable tester recommended for water tests by the maker to the armor of the wet cable. Connect several of the pairs of this cable that test wet to the armor. Remove the line and drop or relay from the pair connected to the cable tester. If these connections are made correctly and the proper exploring coil used, this trouble should be readily located.



The dotted lines illustrate how the tone will scatter and be heard past the wet spot and to the dead grounds that have been allowed to accumulate in the cable

The second test will be made from the out end of the cable or can top as follows: Connect one pair that shows heavy water leak to one post of the cable tester. Connect the other post recommended by the makers of the cable tester to the armor of the cable that is wet. Connect several wet pairs to the armor at the same point at which the cable tester is connected. Leave all lines connected to the cable except the line on the pair connected to the cable tester which should be disconnected at the office. If the connections are made as suggested in this second test the trouble should be easily located.

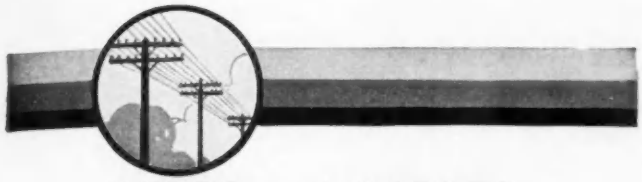
Looking for Trouble

What to look for after you have started out on the cable with the exploring coil may be described as follows:

If the pairs that are wet test much lower resistance to short or cross than to ground look for this trouble in a splice or taped repair or wrap up.

If the pairs test heavy to ground and show little short or cross reading, look for this trouble in the cable and not in splices.

(*Continued on page* 42.)



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This company can supply you with any size, any grade or any type of wire or cable, either bare or insulated to suit your requirements.

Besides this you have the cooperation of a staff of experts in wire and cable manufacture, trained to value quality above all else—backed by a firm which has been in this one business for over forty years. Write for prices.

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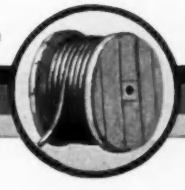

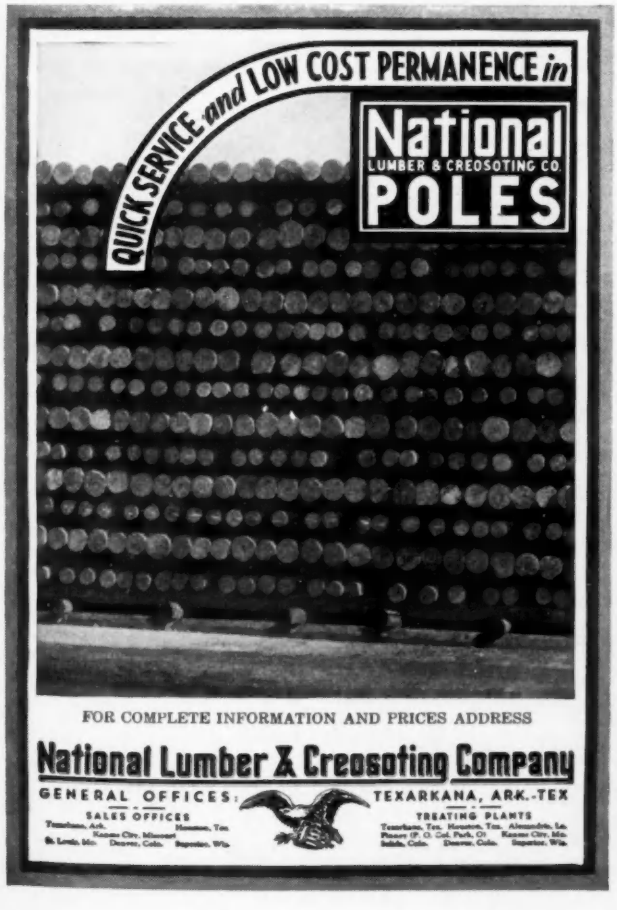

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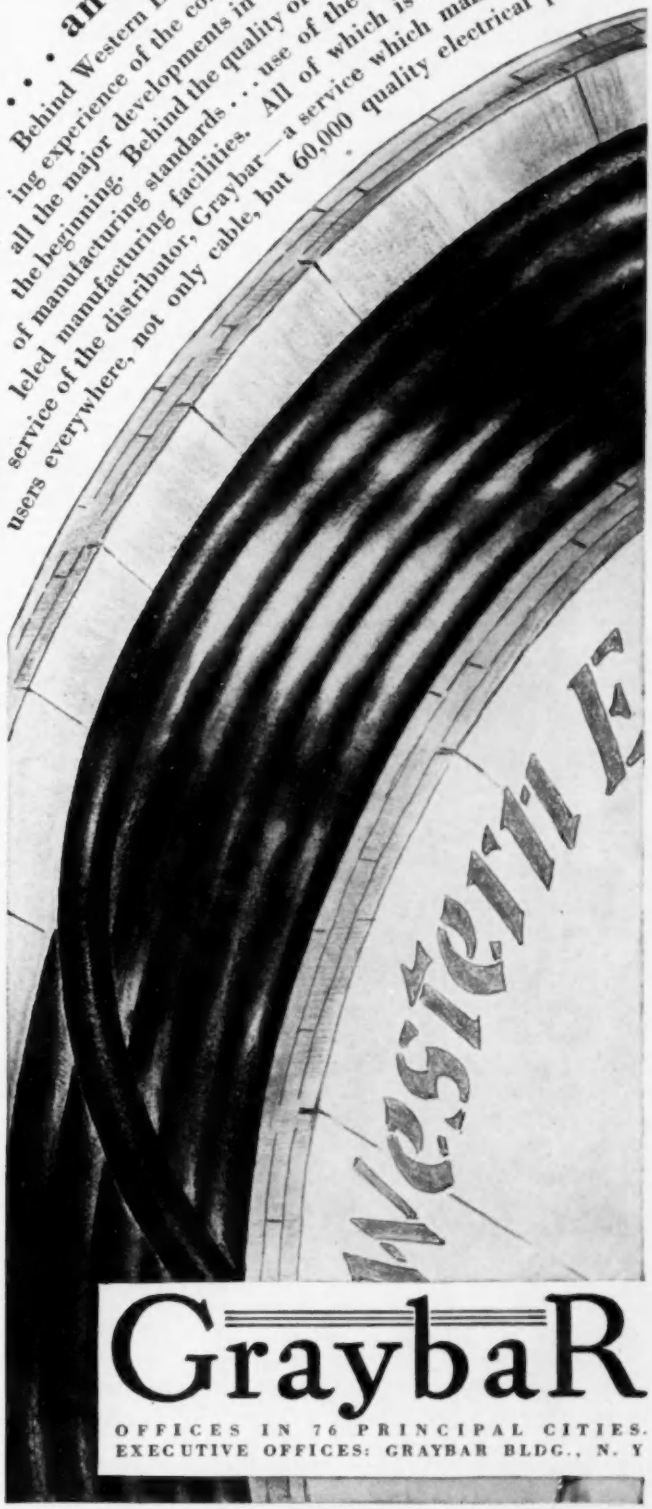
Behind Western Electric Lead Covered Cable stands the pioneering experience of the company that has been responsible for nearly all the major developments in the telephone cable-making art since the beginning. Behind the quality of this cable, too, stand the strictest of manufacturing standards . . . use of the finest materials . . . unparalleled manufacturing facilities. All of which is supplemented by the service of the distributor, Graybar—a service which makes available to users everywhere, not only cable, but 60,000 quality electrical products.



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Install New Switchboard in Flora

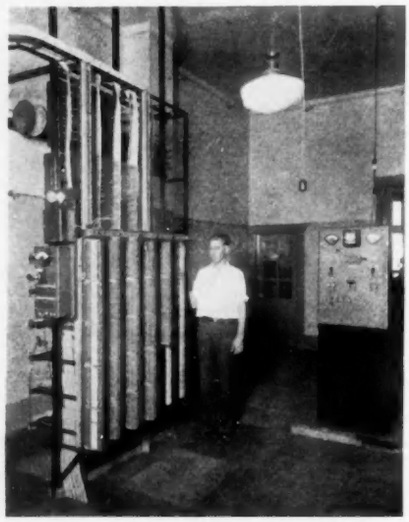
Stromberg-Carlson Equipment Chosen for Indiana Exchange by Union Electric Company of Abilene, Kansas

By C. F. Sanders, Sales Engineer,
Stromberg-Carlson Telephone Mfg. Co.

Flora, Ind., was one of the first Indiana communities to be settled. A group of immigrants crossed over from Pennsylvania and Flora was named after one of the settlers, Abraham Flora.

Today this town is the center of a prosperous community surrounded by improved farms that are owned and operated by the descendants of the original settlers. It has a population of 2,000.

The town boasts a number of thriving industries, among which is a large branch plant of the Indiana Condensed Milk company, and a large poultry and egg plant owned and operated by local business men which does an annual business of more than $2,000,000. Its trucks collect poultry and eggs from the farms of many counties.



Main distributing frame at Flora, Indiana

Flora also boasts of one of the best bands in Indiana. The band is engaged yearly to play at the automobile speed races in Indianapolis on Decoration Day.

The Union Electric company of Abilene, Kans., recently installed a three-position Stromberg-Carlson Junior Multiple Switchboard for the United corporation exchange at Flora. This new equipment has provided Flora and the surrounding community with rapid and efficient service and has been a great asset in carrying on the business of this community. The exchange at Flora is under the direction of F. M. Lantz. Officials of both the Union Electric company and United corporation have expressed complete satisfaction with the equipment.

The positions of the junior multiple switchboard consist of high efficiency universal cord circuits which provide for bridge manual listening, ringing on either answering or calling cord, audible busy test, repeating coils in each circuit to insure maximum efficiency with minimum noise from inductive disturbances, nonring repeating coils in cord circuits which eliminate confusion as subscribers "ring-off" does not pass through the cord circuit to the connected line, double supervisory signals, and automatic adaption to the line in which the plug is inserted which precludes any necessity of particular cord selection and generator cut-off on calling cord.

The operator's telephone circuit provides for modern features among which are anti-side tone qualities, common monitoring key and duplicate cut-in jack.

FINDING WATER TROUBLE IN TELEPHONE CABLES

(*Continued from page* 40.)

If the trouble comes in with a light rain and dries out rapidly, look for a large opening in lead armor on side or top of cable.

If the water tests on all of the pairs in the cable and stays in for several days and reads to be heavy look for a small hole or crack in the side or bottom of cable.

If water trouble appears on a hot, dry day, look in sleeves or splices for this trouble.

Features of Water Trouble

The method of separating water trouble from nearly all other kinds of cable trouble is as follows: If the ground short or cross tests reasonably low resistance, and this resistance does not change during a period of several hours, the trouble is usually caused by something other than water.

If the trouble tests low resistance when first connected to the meter and increases to a higher resistance as the meter is left connected over a period of two or three minutes of continuous reading, or if when tested several times over a period of several hours the resistance continues to rise sometimes several thousand ohms, then you may feel sure that the trouble is caused by water.

Many steps and much time can be saved while locating with the exploring coil if these points are kept in mind.

Another good practice is to start locating from the other end of the cable away from the cable tester. That is, if the test is being made from the office, start locating from the out end of the cable. If the cable tester is connected from the out end of the cable start locating from the office end. By using this method instead of the usual one of always starting from the cable tester, no tone is heard until the trouble is reached. With this method of locating trouble, the man making the test is not confused with any difference of tone between two points on the cable.

Of course it is understood that all testers will not agree on these suggestions, but this request is made: after you have tried your favorite method and failed, don't give up before trying one of the tests recommended here. You should be pleased with the results obtained.

NORTHWEST AIRWAYS INSTALLS RADIO-TELEPHONES

Northwest Airways, one of the pioneer air transport companies of the United States, has ordered over $50,000 worth of radio telephone units from the Western Electric company to complete its program of equipping landing fields and planes for two-way radio-telephone service. The project involves equipment for four ground stations and 17 planes.

The landing fields to be equipped with radio-telephone stations are located at Bismarck, N. Dak.; Milwaukee and Madison, Wis.; and Chicago. Four other fields on Northwest Airways are already equipped with two-way radio-telephone stations. They are at Duluth and St. Paul, Minn.; Fargo, N. Dak.; and the lines' terminus on the Canadian border at Pembina, N. Dak.

Northwest Airways, carrying passengers, mail and express, flies between principal cities in five northwestern states, and through its spur to Pembina connects with the Canadian Air Mail on the way to Winnipeg. Its routes cover more than 1,500 miles. With the new radio-telephone apparatus installed, pilots on all Northwest planes will have two-way communication with their own ground stations over this entire mileage and will also receive government weather broadcasts and radio beacon signals.

WUHAN TELEPHONE ADMINISTRATION PURCHASES NEW EQUIPMENT

The Wuhan (China) Telephone Administration has purchased 8,500 automatic telephone sets and necessary allied equipment from a German concern for the installation of an automatic telephone system in the Wuhan cities. The switchboard in Wuchang, which has a capacity of 1,500 lines, has already been set up but it will be several months before the system will be ready for use.

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against overload or burnout

LITTELFUSES protect electrical instruments and delicate equipment, saving their cost many times over on one burnout. Available in range from 1/100 to 2 amps. Assorted carton of 50 Littelfuses (containing sizes for every instrument range) and 10 mountings with installation directions, price complete, $8.30. Order through regular dealer or direct. Write for instructive bulletin.

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We can supply you with any book you desire. Ask for our list of technical books.

TELEPHONE ENGINEER, CHICAGO

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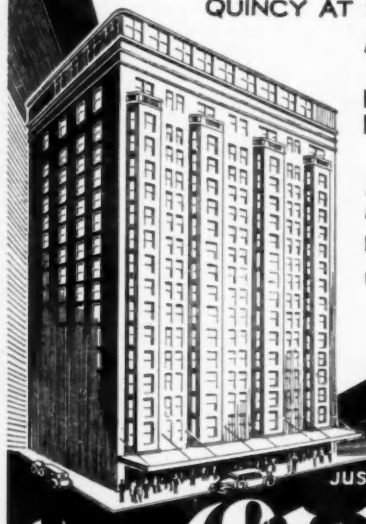

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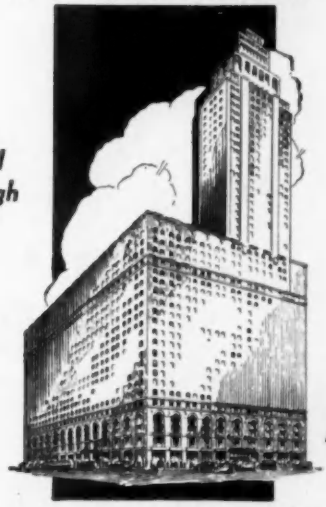

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2500 ROOMS $3.00 UP

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Madison and Clark Streets CHICAGO

With Manufacturers and Jobbers

THE NEW STEWART CABLE TESTER

Stewart Brothers, Ottawa, Ill., have brought out a new model cable tester much smaller in size and more efficient in operation than their previous one. This cable tester operates on two dry cells instead of four.

Also a tone test circuit has been built into the instrument having a con-

New cable tester designed by Stewart Bros. of Ottawa, Ill.

denser in the circuit and delivering a low voltage tone that can readily be heard in receiver when picking out pairs in new cable or tag splices.

A new exploring coil has been designed that is very efficient for locating short circuits. This coil has the feature of balancing out the current that is passing over the cable sheath and also the messenger which makes it possible to locate wet spots and water trouble very readily.

A new vibrator has been designed making it possible to use the new cable tester in any room without disturbing anyone. This new and improved instrument sells at a lower price.

FWD WILL CONCENTRATE ON NATURAL MARKETS

The sales and advertising campaign for the Four Wheel Drive Auto company, Clintonville, Wisc., for 1932, will be a continuation of the policy of concentrating on natural FWD markets. R. H. Schmidt, general sales manager of the FWD company, originated this policy in 1926.

He says, "The FWD's present policy of concentrating on markets where FWD trucks render a distinct service has proven so effective that we will, undoubtedly, adhere to it for several years to come. It not only is a systematic form of sales management, and profitable from a manufacturer's viewpoint, but also enables us to work closely with our prospects and customers and render them intelligent service in their trucking problems."

"A typical example of the result of this system," continues Mr. Schmidt, "is the sale of our product to the highway field. We have worked with state, county and municipal highway departments for several years in developing a truck particularly suited to their needs. The effectiveness of this type of co-operation with our users and prospects is indicated in our present record of 39 state highway departments, 6 Canadian provincial highway departments, and over 600 counties having purchased FWD trucks."

SPINDLER IS NEW KEARNEY REPRESENTATIVE

The James R. Kearney corporation announces the appointment of Carl J. Spindler as its representative in the Illinois, Wisconsin, Michigan and Indiana territory. Mr. Spindler will replace H. C. Fiske, who has been appointed assistant chief engineer with headquarters in St. Louis.

Mr. Spindler graduated from the University of Illinois in 1920. His first position was with the Illinois Traction System at Peoria in the valuation and rate department. He later moved to Chicago with the Illinois Power & Light corporation as assistant valuation and rate engineer. In 1926 Mr. Spindler joined the Copperweld Steel company as representative in the middle western territory. Mr. Spindler is representing the Kearney corporation in the same territory, and his many friends will be pleased to know of his new connection.

SELECT STROMBERG-CARLSON PROGRAM SERVICE

The Wm. T. Rock Electric company of Bridgeport, Conn., has just purchased a two-channel No. 2 Stromberg-Carlson program service system for the New Canaan Junior High School at New Canaan, Conn. The system will include amplifying equipment, No. 19 Stromberg-Carlson loud speakers, microphone, phonograph and radio equipment.

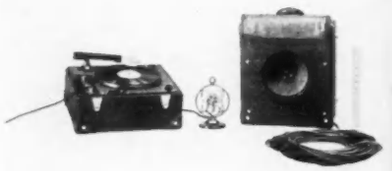
NEW LIGHT WEIGHT PORTABLE PUBLIC ADDRESS SYSTEM

Many of the more progressive telephone companies are finding an additional source of revenue in the rental of public address systems. Banquets, conventions, sporting events, impromptu public gatherings, political meetings, outdoor overflow audiences, dances, even funerals—each of these is a possible opportunity for income.

Typical of equipment designed to cover this market is the exceptionally convenient and dependable voice and music system known as the new Style PT-463 Midget portable public address system, recently developed by the Webster company, 856 Blackhawk street, Chicago.

Complete in one carrying case, weighing less than 40 pounds, is the following equipment:

1. Powerful push-pull amplifier employing screen grid and pentode tubes.
2. Phonograph turntable, driven by electric motor, which plays either 33⅓ or 78 r.p.m. records.
3. One microphone—control provides



Webster Midget Portable Public Address System—a complete all-electric voice and music amplifier system weighing less than forty pounds

for the possibe mixing of phonograph and microphone input, allowing musical background for vocal announcements.

4. One high-grade dynamic speaker—provision is made for plugging in one addition speaker when desired.
5. Fifteen feet of microphone cable—polarized plugs prevent possibility of wrong connections.
6. Thirty feet of speaker cord.
7. All-electric filament and plate power supply, deriving current from 110 or 220 volt, 50-60 cycle alternating current.

It is said that one man can easily transport the entire system, which when packed measures only 13x14x15½ inches. He can set it up, ready for operation, in five minutes or less. The system has an output of more than six watts, sufficient volume without distortion to fill a medium size auditorium.

Strong construction with adequate protection for tubes and other fragile parts minimizes any danger of damage. Simplicity of operation is another feature.

WANTED

By experienced telephone man a position as Manager of exchange or group of exchanges; can deliver the goods if you want good telephone service, can do maintenance, have executive ability, can handle men and operators. For further information write M. H., care of Telephone Engineer.

FOR SALE

W. E. No. 14 unprotected cable terminal, 16 pair less stubs @ $2.50 each. Complete with stubs @ $4.50.
W. E. No. 58-A protector, with fuses @ 60c. No. 60-A protector @ 35c.
Cook No. 10 Central office protectors, 20 per strip, @ $10.00.
THE TELEPHONE REPAIR SHOP
1760 Lunt Ave., Chicago, Illinois

WARDALL NEW ASSOCIATED PRESIDENT

Marshall E. Sampsell, president, Associated Telephone Utilities company since its inception in 1926, announced Wednesday, March 30, that at a directors' meeting which had just been held, he had resigned as president of the company and that William J. Wardall, Chicago, had been elected president and Harold V. Bozell of New York had been elected executive vice-president, the latter two having also been elected directors of the company.

In connection with this change in the executive personnel, Mr. Sampsell pointed out that the company has grown from a gross of approximately $2,000,000 in 1926 to almost $18,000,000 in 1931, with operations in 25 states, controlling over a half million telephones, and that the executive problems in connection with the administration of this system have grown manyfold and require more executive time and attention than he can now give to them.

Mr. Wardall, the new president, is well known and highly regarded in financial circles in Chicago and elsewhere. He is a past governor and past vice-president of the Investment Bankers' Association of America. Until recently he was western manager of Bonbright & Company, Inc., with headquarters in Chicago.

Mr. Bozell, the executive vice-president, is an electrical engineer; he has practiced electrical engineering for many years, including a consulting practice with telephone companies; and at both Oklahoma and Yale universities has handled courses in telephone engineering and in utility operation and management. He was also editor of Electrical World for about three years. For the past several years he has been connected with Bonbright & Company in New York.

The two vice-presidents of Associated Telephone Utilities company, namely, S. L. Odegard and J. F. O'Connell, who have concerned themselves primarily with operating problems of the various operating subsidiaries, continue in those positions.

CHANGE SHANGHAI TELEPHONES TO AUTOMATIC.

The International Telephone and Telegraph corporation has received the following message by Mackay Radio from Frank Gill, vice-president of the Shanghai Telephone company:

"Our contracts with the Municipal Councils to convert Shanghai telephones to automatic operation within two years is now finished in less than twenty months. The completion is marked by cutting over the West Central office, with 6,000 lines, according to schedule. Shanghai's telephone system is now 92.65 per cent automatic. Only stations not fully automatic are 3.69 per cent semi-automatic and 3.66 per cent manually operated, both of which are outside the International Settlement and our company is under no obligation there."

The completion of this program four months ahead of schedule, especially in view of the extraordinary demands for service and the difficulties of working under the handicaps caused by the fighting between the Chinese and Japanese armies, is undoubtedly the outstanding telephone development thus far in 1932. The last previous "cutover" of an exchange to automatic operation was made in the middle of February when the fighting was at its height.

The interest of the International Telephone and Telegraph corporation in the Shanghai Telephone company dates from August 5, 1930, when a forty-year franchise was signed by officials of the International and French Settlements. The development program started immediately, including the erection of new buildings, the rearrangement of exchange areas and the complete rehabilitation of the outside plant. The installation of automatic or dial telephones was begun due to the polyglot of languages and the many Chinese dialects spoken by the population, which numbers about 1,500,000.

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CONCERNS INSTALL PROGRAM SERVICE EQUIPMENT

A two channel No. 3 Stromberg-Carlson System has been purchased by the Jandous Electric Equipment company, Inc., of New York City, for installation in the Queens General Hospital, Queens, New York. The system will include amplifying equipment, No. 27, loud speakers and radio equipment.

O'Brien & Walsh, Inc., Long Island City, New York, has ordered from the Stromberg-Carlson Telephone Manufacturing company, a four channel No. 3 program service system to be installed in the Lowery Street apartments, Long Island City. The system will include amplifying equipment, No. 26 Stromberg-Carlson wall flush loud speakers, microphone and radio equipment.

CHICAGO RETAIL STORE GIVES TELEVISION SHOW

Citizens of, and visitors to, Chicago, stood in line during the last week in March to see the first television performance broadcast in Chicago, with the exception of that during the radio show.

The performance was sponsored by Sears, Roebuck & Company as a feature of the opening of their new Chicago down-town retail store.

The program originated in one of the store's large corner windows, and was received on the fourth floor. All week crowds milled around the window, watching an orchestra, a singer, and a speaker performing for television. Upstairs, too, people waited in line for their turn at the ten-minute show.

The pictures, as they came over the air, were all close-ups, since the television machine is not yet able to take in an entire room, or even a corner of a room, full of people, and the nervous tendencies of the pictures were reminiscent of the old "flickers" which preceded today's talking pictures.

TELEPHONE EMPLOYES GIVEN LIFE INSURANCE

Two hundred and forty employes of the Illinois Southeastern Telephone company, the Illinois Consolidated Telephone company and associated companies, with headquarters at Mattoon, Ill., have been covered with life insurance protection through a group policy involving a total of $312,200.

The terms of the policy, which was issued by the Prudential Insurance Company of America, provide for insurance in amounts ranging from $1,000 to $2,500 for each worker, according to the amount of salary received and the premium payments will be shared by the employes and the employing company, the policy being of the contributory type.

RECONSTRUCTED EQUIPMENT

Western Elec. No. 25A or No. 76 repeating coils—2 coils mounted on one mounting block, per pair @....	$ 5.25
Kellogg No. 101E 500 ohm combine line drops and jacks, 10 per strip @	11.50
Stromberg No. 11 combine line drops and jacks, per strip of 5 @.....	7.00
Holtzer-Cabot 110-volt A. C. Motor H. P. ⅛ Speed 1150 R. P. M. @	10.00
Kellogg No. 2812 Latest type 5-bar 1600 ohm Bdg. compacts @.....	10.50
Kellogg No. 84 desk set with No. 2361 5-bar 1600 ohm inside connection signal set @	11.75
Kellogg No. 301 Combine line drops and jacks, per strip of 5 @.....	7.50
Kellogg No. 97 C. B. desk set with Straight line No. 75 Steel bell box @..	7.00
Cook No. 10 Arresters, per bank of 20 lines with heat coils @.....	8.50
Chicago Tel. Supply Co. 4-bar 1600 ohm Bdg. compacts @	6.25
Western Elec. No. 22 3-bar Generators with Crank & Screws @.....	1.50
Stromberg No. 104 type 4-bar 1600 ohm Bdg. compacts @	6.90
Automatic Elec. Receivers with cord and New W. E. Shell and Cap @..	1.10
Monarch L. B. Ind. Coils, 4-clip type @	.35

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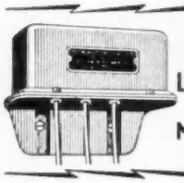

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